



I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES

Section 5—Final Environmental Impact Statement

APPENDIX M FINAL STREAM ASSESSMENT REPORT

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I-69 EVANSCVILLE TO INDIANAPOLIS
Tier 2 Studies
Final Stream Assessment Report
Section 5, SR 37 to SR 39



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I-69 EVANSVILLE TO INDIANAPOLIS, TIER 2 STUDIES

Stream Assessment Report, Section 5

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1.0 INTRODUCTION

In March of 2004 the Tier 1 Record of Decision (ROD) for I-69 was issued identifying Alternative 3C as the preferred corridor for I-69 and paving the way for the initiation of Tier 2 Studies. The 142-mile long I-69 project corridor (approximately 2,000 feet wide) from Evansville to Indianapolis was divided into six sections for the purpose of these studies. Each of the six Tier 2 section study teams have or will determine the final alignment of the interstate within the approved corridor. This document includes environmental studies and engineering assessments for Section 5, which has culminated in a recommendation of Refined Preferred Alternative 8 as the preferred alternative within Section 5 of the approved Alternative 3C corridor.

The termini of Section 5, as approved in the Tier 1 ROD for I-69, dated March 24, 2004, are located at SR 37 south of Bloomington in Monroe County, and just south of SR 39 near Martinsville in Morgan County. The I-69 Section 5 corridor is centered on existing SR 37, a four-lane divided highway, and will upgrade the existing arterial roadway to interstate standards. The impacts, benefits, and costs of alternatives are fully evaluated in the Final Environmental Impact Statement (FEIS) for Section 5, with recognition that these features include facets which are currently attributable to the existing highway facility. Section 5 is approximately 21 miles in total length and is within the jurisdiction of the Louisville District of the Army Corps of Engineers (USACE). **Figure 1** and **Figure 2**, located at the end of this report, depict the relationship of the Alternatives on United States Geological Survey (USGS) topographic maps and aerial photographs, respectively.

The Upper White River Watershed, Lower White River Watershed, and Lower East Fork White River Watershed are the three 8-digit watersheds traversed by the project corridor. The project crosses three sub-watersheds of the Upper White River Watershed: Indian Creek-Sand Creek Watershed, Little Indian Creek-Jordan Creek Watershed, and Bryant Creek Watershed. The project crosses four sub-watersheds of the Lower White River Watershed: Beanblossom Creek-Indian Creek Watershed, Beanblossom Creek-Buck Creek/Muddy Fork Watershed, Beanblossom Creek-Stout Creek Watershed, and Griffy Creek Watershed. The project crosses two sub-watersheds of the Lower East Fork White River Watershed: Clear Creek-May Creek Watershed and Clear Creek-Jackson Creek Watershed.

Section 5 of I-69 entails upgrading an existing multi-lane, divided transportation facility to a full freeway design. Most of the right-of-way used for the Section 5 project already is devoted to transportation use. Five Build Alternatives were carried forward for detailed analysis in the Section 5 Draft Environmental Impact Statement (DEIS). This stream assessment report identifies the streams that are impacted by these five Alternatives. After the comment period ended for the DEIS, the Preferred Alternative identified in the DEIS was further modified, resulting in the Refined Preferred Alternative 8, which is identified as the preferred alternative for Section 5. The impacts to streams from the Refined Preferred Alternative 8 are also discussed in this report.

In some cases, the stream impacts identified in this report differentiate those which occur within the existing rights-of-way for SR 37 and other transportation facilities from those which occur outside the rights-of-way for SR 37. Many of the streams discussed in this report have been previously modified and/or impacted (i.e., captured in ditches, concrete channels, pipes, culverts, and/or bridges).

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All stream segments not within existing culverts with an ordinary high water mark that are crossed by the Alternatives were surveyed, as appropriate. A single stream impact may have more than one stream assessment segment due to the fact that if the habitat along the length of the stream changed, a separate assessment was made. However, if the habitat along the entire impacted length of the stream did not change only one assessment segment was completed. If two or more Alternatives cross a stream in the same location and the habitat was consistent throughout the stream reach, only one assessment was made. The streams were generally assessed from the south end to the north end of the corridor, and the numbering system *generally* follows that course. A total of 370 stream impact segments were identified and surveyed using the Qualitative Habitat Evaluation Index (QHEI) (Rankin, 1979) or the Headwater Habitat Evaluation Index (HHEI) depending on drainage area and maximum pool depth of each stream segment. Surveys were performed in accordance with the Indiana Department of Environmental Management's (IDEM's) Standard Operating Procedure. Water chemistry and biological sampling were not performed in this survey.

The information compiled in this report will serve as a data source for the evaluation of project Alternatives, future environmental reports and ultimately for the preparation of required waterway permits.

1.1 REGULATORY DEFINITIONS

To comply with the requirements of the National Environmental Policy Act, 1969 (NEPA), the potential impacts on sensitive resources must be examined and considered for proposed Federal transportation facilities. These resources include, but are not limited to, floodplains, wetlands, endangered species, historic and archeological sites, parklands, air quality, wildlife habitat, "Waters of the United States." and others.

The term "Waters of the U.S." is defined in the CWA (40 CFR §122.2) and means:

- (a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (b) All interstate waters, including interstate "wetlands";
- (c) All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds; the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
 - (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;
 - (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - (3) Which are used or could be used for industrial purposes by industries in interstate commerce;
- (d) All impoundments of waters otherwise defined as waters of the United States under this definition;
- (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;
- (f) The territorial sea; and

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- (g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act (CWA) are not Waters of the U.S.

“Waters of the State” means accumulations of waters that are within, partially within, or border on the State of Indiana. The term includes both surface and underground waters, natural and artificial waters, and public and private waters. However, the term does not include any private pond, or any pond, reservoir, or facility built for the reduction or control of pollution. Nor does it include ponds, reservoirs, or facilities built for the cooling of water prior to discharge unless the discharge causes or threatens to cause water pollution.

“Waters of the State” are defined in Indiana Code 13-11-2-265 as meaning:

- (a) "Waters", for purposes of water pollution control laws and environmental management laws, means:
- (1) The accumulations of water, surface and underground, natural and artificial, public and private; or
 - (2) A part of the accumulations of water;
- (a) That are wholly or partially within, flow through, or border upon Indiana.
- (b) The term "waters" does not include:
- (1) An exempt isolated wetland;
 - (2) A private pond; or
 - (3) An off-stream pond, reservoir, wetland, or other facility built for reduction or control of pollution or cooling of water before discharge.
- (c) The term includes all Waters of the United States, as defined in Section 502(7) of the federal Clean Water Act (33 U.S.C. §1362(7)), that are located in Indiana.
- (d) As added by P.L.1-1996, SEC.1. Amended by P.L.183-2002, SEC.1; P.L.282-2003, SEC.31; P.L.52-2004, SEC.4.

The Waters of the U.S. and the Waters of the State may include perennial, intermittent, and ephemeral streams as defined below.

Perennial Streams: Perennial streams are streams that flow throughout the majority of the year (greater than 90% of the time) and flow in a well-defined channel. However, perennial streams can “dry up”, particularly during extended periods of drought. All streams that were identified on the USGS maps by a solid blue line were considered perennial streams for this report.

Intermittent Streams: An intermittent stream is a stream that flows only during wet periods of the year (30% to 90% of the time) and flows in a continuous well-defined channel. During dry periods, especially in summer months, intermittent streams may go down to a trickle of water and appear dry when, in fact, there is water flowing through the stream bottom or “substrate”. All streams that were identified on the USGS maps by a broken blue line were considered intermittent streams for this report.

Ephemeral Streams: An ephemeral stream is a stream that flows only during and for short periods following precipitation (less than 30% of the time); and flows in low areas that may or may not have a

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well-defined channel. Some commonly used names for ephemeral streams include: stormwater channel, drain, swale, gully, hollow, or saddle. Since ephemeral streams are often headwater streams, it is typically recommended that roads, site-prep, and other soil disturbing activities be minimized in ephemeral streams to avoid erosion and sedimentation of stormwater runoff that will flow downstream to larger streams or waterbodies. All streams identified in the field that were not represented on the USGS maps were classified as ephemeral streams for this report.

1.2 POTENTIAL HABITAT QUALITY IMPACTS

The Section 5 Study Area consists of three primary land uses including forest, developed land, and agricultural land. Developed areas consist mainly of residential areas along with some businesses. These developed areas are scattered throughout the Study Area; however, developed land uses are concentrated near the City of Bloomington. Land use and land cover within the Section 5 corridor are dominated by developed land in the southern portion and by undeveloped upland and agriculture to the north. Developed land accounts for about 39% of the land cover while upland habitats account for about 46% of the land cover. Agricultural lands, primarily pasture, account for approximately 13% of the Section 5 land use. Water and wetlands comprise the remaining 2% of the corridor, while sand/gravel operations and limestone quarry companies make up less than 1% of the land cover within the Section 5 corridor. The existing 1970's SR 37 4-lane pavement, structures, and right-of-way make up a significant portion of the Section 5 corridor. The predominant forest type within the corridor is oak-hickory.

Expected habitat impacts to the streams in Section 5 relate to highway construction and operation, and include: direct habitat loss, channelization, relocation, removal of instream cover, removal or narrowing of riparian zones, sedimentation, nutrification, and other impacts relating to highway runoff. Section 5 of I-69 entails upgrading an existing multi-lane, divided transportation facility to a full freeway design. Most of the right-of-way used for the Section 5 project already is devoted to transportation use. Many of these impacts are currently roadside ditches within existing transportation right-of-ways.

1.3 METHODOLOGY

1.3.1 Location of Survey Sites

Survey sites were located by finding the intersections of the Alternative alignments with each ephemeral, intermittent, and perennial stream impacted.

A combination of techniques was used to identify streams, including the use of topographic maps, soil surveys, Digital Elevation Models, and on-site field verification. These data sources were used to compile an updated digital coverage of jurisdictional waterways within the Study Area. Identified streams were generally assessed from the south end to the north end of the corridor, and the numbering system *generally* follows that course.

Prior to beginning fieldwork, the type of evaluation (QHEI or HHEI) required for each stream within the preliminary work limits was determined based on watershed size and subsequently confirmed on-site. A minimum of one evaluation was completed for each stream falling within any of the project Alternative impact footprints. The assessment reach was generally centered approximately at the point the

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Alternative centerline crossed the waterway. Additional evaluations were completed for streams if dramatic changes in function (i.e. channel, flow, substrate, cover) occurred within the section of waterway impacted. For example, a stream that originates as a channelized agricultural ditch, which then flows into a forest where it becomes a natural channel, received one evaluation for the modified channel and a second evaluation for the natural channel. In addition, HHEI evaluations were performed on either side of a culvert or pipe regardless of a change in habitat. Multiple evaluations were also performed in instances where an individual Alternative crossed a stream in more than one location or where multiple Alternatives crossed the same stream segment in more than one location.

1.3.2 Delineation of Watersheds

The on-line Geographic Information System (GIS) program and the Hydrologic Map Server-Online Watershed Delineator (HYMAPS-OWL, developed by Purdue University), were used as the basis for developing the watershed of several of the major streams within the project corridor boundary. A total of 172.06 square miles of watershed areas are associated with the Section 5 Alternatives' stream crossings.

1.3.3 Field Surveys

Each site was located in the field using aerial photographs and a Global Positioning Satellite (GPS) receiver. Sites were examined to determine if a bed and bank were present. Grassy swales were not surveyed because they did not meet the definition of "Waters of the U.S." or "Waters of the State". Sites were identified and a two-hundred foot reach (or maximum length of stream segment if less than 200 feet available) was measured off with the site at the center of the reach. Photographs upstream and downstream of each site were taken using a digital camera. Alterations to drainage channels that deviated from the mapped channels were noted and the altered channels were located by GPS for revision to the GIS data. Additional channels that did not appear on the aerial photo field maps were also located by GPS and the site was surveyed using either the QHEI or HHEI standardized forms.

Data collected in the field were entered into database tables. The project maps were updated from digitally corrected GPS files and additional channels were added to the GIS project data.

Tabulated data included:

1. Site identification number
2. Universal Transverse Mercator (UTM) coordinates
3. Quarter-section, Section, Township, and Range
4. 7.5-minute Quadrangle name
5. County
6. Date of survey
7. Type of survey, QHEI or HHEI
8. Survey score
9. Watershed area
10. Map gradient
11. Stream flow (perennial, intermittent, or ephemeral)
12. Classification code (Cowardin, 1979)

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13. Associated alignment

1.4 ANALYSIS

A total of 370 field survey sites (stream segments) were completed within the Section 5 Build Alternatives. QHEI surveys were performed on 29 of the sites and HHEI surveys were performed on 341 of the sites. **Figure 1** and **Figure 2** (located at the end of this report) contain maps showing the survey site locations.

The Ohio Environmental Protection Agency (OEPA) developed the QHEI for streams and rivers in Ohio (Rankin 1989, 1995). The QHEI is a physical habitat index designed to provide an empirical, quantified evaluation of the general lotic macrohabitat (OEPA, 1989). Although the OEPA originally developed the QHEI to evaluate fish habitat in streams, IDEM utilizes the QHEI as a measure of general habitat quality. The QHEI is composed of six metrics including substrate composition, in-stream cover, channel morphology, riparian zone and bank erosion, pool/glide and riffle/run quality, and map gradient. Each metric is individually scored and then summed to provide the total QHEI score. The highest possible score is 100.

The QHEI evaluates the characteristics of a stream segment, as opposed to the characteristics of a single sampling site. Thus, the QHEI provides an averaged quality index over the length of a reach instead of a site score that may be influenced by a localized disturbance. QHEI scores from hundreds of stream segments in Ohio have indicated that values greater than 60 are generally conducive to the existence of warm water faunas. Scores greater than 75 typify habitat conditions that have the ability to support exceptional warm water faunas (OEPA, 1999). Rankin (1995) had indicated that stream QHEI's scoring less than 33 were not meeting designated uses for aquatic life in Ohio.

QHEI scores are classified by the OEPA as:

- >75 Exceptional Warm Water Habitat
- 60-75 Suitable for Warm Water Habitat without use impairment
- 45-60 Warm Water Habitat under some circumstance, but may show level of impairment that requires reclassification as Modified Warm water Habitat
- 32-45 Modified Warm Water Habitat
- <32 Modified Warm Water Habitat if watershed area is greater than 3 mi², otherwise Limited Resource Water.

The OEPA developed the HHEI for the extreme headwater habitats of rivers and streams in Ohio (Primary Headwater Habitat, PHWH). Ohio defines these extreme headwaters as primary headwater habitat streams having a defined bed and bank, with either continuous or periodical flowing water, with watershed areas less than or equal to 1.0-square mile, and maximum depth of water pools equal to or less than 40 centimeters (approximately 15.7 inches). The HHEI is based on three physical measurements that have been found to correlate well with biological measures of stream quality; substrate, maximum pool depth, and bank full width (OEPA, 2002).

OEPA (2002) classified headwater streams as Class I, II, or III habitats. The HHEI classifications were

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based on habitat scoring. In some instances, the HHEI classification guidelines would require additional biological evaluations to verify the classification.

Class I PHWH - A certain percentage of the primary headwater stream channels were observed to be normally dry, with little or no aquatic life present. This type of primary headwater is normally identified as an ephemeral stream, with water present for short periods of time due to infiltration from snow melt or rainwater runoff, is herein referred to as a Class I-PHWH stream (HHEI score less than 40). If a Class I-PHWH stream is no longer in its natural channel it is considered a Modified Class I-PHWH stream (HHEI score 0 to 30).

Class II – PHWH - Streams found to have a moderately diverse community of warm-water adapted native fauna either present seasonally or on an annual basis. The native fauna of these streams is characterized by species of vertebrates (fish or salamanders) and/or benthic macroinvertebrates that are pioneering, headwater, temporary, and/or temperature facultative. This type of PHWH stream is herein referred to as a Class II PHWH stream (HHEI scores equal to or greater than 40 and less than 60). If a Class II-PHWH stream is no longer in its natural channel it is considered a Modified Class II-PHWH stream (HHEI score equal to or greater than 30).

Class III – PHWH - Streams found to have native fauna adapted to cool-cold perennial flowing water characterized by a community of vertebrates (either cold water adapted species of headwater fish and/or obligate aquatic species of salamanders from the lungless family Plethodontidae), and/or a diverse community of benthic macroinvertebrates including cool water taxa, with larval life stages resident in the stream continuously on an annual basis. This type of PHWH stream is herein referred to as a Class III-PHWH stream (HHEI scores equal to or greater than 60). Note that streams with HHEI scores between 50 and 59 with more than 20% of the substrate being cobble, boulder, boulder/slab, or bedrock are also classified as Class III-PHWH streams. One of the criteria of a Class III-PHWH stream is that the stream is in its natural channel; therefore, there cannot be any Modified Class III-PHWH streams.

1.4.1 Results

Appendix A contains the stream impacts and stream relocation lengths by alternative in tabular form. **Appendix B** contains Stream Impact Site forms and QHEI or HHEI site forms.

Headwater Streams

Most headwater habitat streams (watersheds <1.0 mi²) in the study area contained little or no water, or only isolated pools. As expected from the underlying bedrock formations, the predominant substrate materials were gradations of limestone and sandstone. Stream gradients ranged from flat to severe. HHEI scores ranged from 6 to 86 with an overall average score of 30.24 (see **Appendix A** – Stream Impacts and Stream Relocation Lengths by Alternative).

Perennial Streams (south to north)

Streams for which QHEI surveys were performed had gravel, hardpan, sand, and silt substrates. QHEI scores ranged from 24 to 66.5 with an overall average score of 44.98 (See **Appendix A** – Stream Impacts and Stream Relocation Lengths by Alternative).

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Griffy Creek (S5-s065a_1 and S5-s065a_3)

Segment S5-s065a_1 is upstream of the Bayles Road culverts and S5-s065a_3 is downstream of the road crossing. S5-s065a_2 is the culverted segment. This stream is a perennial stream with good habitat development and moderate sinuosity. The predominant substrate consists of gravel and sand. The stream has a wide riparian corridor associated with both banks. The adjacent floodplain is dominated by forest land. The QHEI score of 61.5 is reflective of a warm water habitat.

Griffy Creek (S5-s065b, S5-s065c, and S5-s065d)

Segment S5-s065b is upstream of the existing SR 37 bridge and S5-s065d is downstream of the bridge. S5-s065c is the portion of stream being bridged and has no functioning riparian corridor along this segment. These segments have experienced previous disturbance and exhibit no recovery. This stream is a perennial stream with poor habitat development and low to no sinuosity where the Alternatives cross this stream. The predominant substrate consists of silt. The stream has a moderately wide riparian corridor associated with both banks, with the exception of the bridged segment which has no riparian corridor. The adjacent floodplain is dominated by an old field. The QHEI score of 37.0 is reflective of a modified warm water habitat.

Beanblossom Creek (S5-s081a and S5-s081b)

Segment S5-s081b includes the bridge carrying old SR 37 over Beanblossom Creek while S5-s081a is the segment upstream from the bridge. This stream is a perennial stream with poor habitat development and low sinuosity where the Alternatives cross this stream. Hardpan is the predominant substrate. The stream has a wide riparian corridor associated with its right bank and a narrow to wide riparian buffer along its left bank. There is no riparian corridor associated with the reach under the bridge. The adjacent floodplain is dominated by forest land. It should be noted that Beanblossom Creek is identified on the Draft 2012 303(d) List of Impaired Waters due to PCB contamination. The QHEI score of 51.5 is reflective of a warm water habitat.

Beanblossom Creek (S5-s081c, S5-s081d, and S5-s081e)

Segment S5-s081c is the portion upstream from the existing bridge carrying SR 37 over Beanblossom Creek, S5-s081d is the bridged portion, and S5-s081e is the portion located downstream from the existing bridge. These segments are recovering from previous channelization due to agricultural practices. This stream is a perennial stream with poor habitat development and no sinuosity where the Alternatives cross this stream. The predominant substrate consists of silt and detritus. The stream has a wide riparian corridor associated with its left bank and a moderately wide riparian buffer along its right bank. There is no riparian corridor associated with the segment under the bridge. The adjacent floodplain is dominated by forest land. It should be noted that Beanblossom Creek is identified on the Draft 2012 303(d) List of Impaired Waters due to PCB contamination. The QHEI score of 34.75 is reflective of a modified warm water habitat.

Beanblossom Creek (S5-s081f, S5-s081g, and S5-s081h)

Segment S5-s081f is the portion from the mouth of Griffy Creek to the North Kinser Pike bridge, segment S5-s081g is the North Kinser Road bridged portion, and S5-s081h is located downstream from the existing bridge. This stream is a perennial stream with poor habitat development and moderate sinuosity. Hardpan is the predominant substrate. The stream has a wide riparian corridor associated with its left bank and a moderately wide riparian buffer along its right bank. There is no riparian

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corridor associated with the segment under the bridge. The adjacent floodplain is dominated by forest land where the Alternatives cross this stream. It should be noted that Beanblossom Creek is identified on the Draft 2012 303(d) List of Impaired Waters due to PCB contamination. The QHEI score of 48 is reflective of a warm water habitat.

Unnamed Tributary to Bryant Creek (S5-s253e)

Even though the watershed for S5-s253e is less than 1.0 mi²; the QHEI methodology was utilized to assess this intermittent stream's habitat community due to its greater than 40 cm (15.7 in) depth. This stream exhibited fair to good habitat development and high sinuosity where the Alternatives cross this stream. The predominant substrate consists of gravel and sand. The stream has a wide riparian corridor associated with its left bank and a narrow riparian buffer along its right bank. The adjacent floodplain is dominated by forest land on the left and transportation (SR 37) on the right. The QHEI score of 55.5 is reflective of a warm water habitat.

Bryant Creek (S5-s288a)

This stream is a perennial stream with excellent habitat development and high sinuosity where the Alternatives cross this stream. The predominant substrate is gravel. The stream has a wide riparian corridor associated with its right bank and a narrow riparian buffer along its left bank. The adjacent floodplain is dominated by forest land on the right and transportation (East Bryants Creek Road) on the left. The QHEI score of 66.5 is reflective of a warm water habitat.

Bryant Creek (S5-s288b and S5-s288c)

Segment S5-s288b is the bridged portion carrying existing SR 37 bridge over Bryant Creek, while S5-s288c is the segment downstream of the existing bridge. This stream is a perennial stream with fair habitat development and moderate sinuosity where the Alternatives cross this stream. The predominant substrate is gravel. The stream has a narrow riparian corridor associated with both its banks, with the exception of the bridged segment which has no riparian corridor. The adjacent floodplain is dominated by forest land. The QHEI score of 64 is reflective of a warm water habitat.

Little Indian Creek (S5-s345c)

This stream is a perennial stream with fair habitat development and low sinuosity where the Alternatives cross the stream. The predominant substrate is sand. The stream has a wide riparian corridor along both of its banks. The adjacent floodplain is dominated by an old field. The QHEI score of 60 is reflective of a warm water habitat.

Little Indian Creek (S5-s345d and S5-s345e)

Segment S5-s345d is the bridged portion carrying existing SR 37 bridge over Bryant creek, while S5-s345e is the segment downstream of the existing bridge. These stream segments have recovered from previous channelization due to agricultural practices. This stream is a perennial stream with poor habitat development and low sinuosity where the Alternatives cross this stream. The predominant substrate is sand and hardpan. The stream has a very narrow riparian corridor along both of its banks. There is no riparian corridor associated with the segment under the bridge. Farmers along the adjacent floodplain have employed conservation tillage. The QHEI score of 52.5 is reflective of a warm water habitat.

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Little Indian Creek (S5-s345f, S5-s345g, and S5-s345h)

Segment S5-s345f begins at the downstream end of the conservation tillage area to the existing bridge over Godsey Road, S5-s345g is the portion of stream being bridged, and S5-s345h is downstream of the existing bridge. These stream segments have recovered from previous channelization due to agricultural practices. This stream is a perennial stream with poor habitat development and low sinuosity where the Alternatives cross this stream. The predominant substrate is sand and hardpan. The stream has a moderately wide riparian corridor along both of its banks. There is no riparian corridor associated with the segment under the bridge. The adjacent floodplain is dominated by forest land on the left and old field the right. The QHEI score of 46.75 is reflective of a warm water habitat.

Jordan Creek (S5-s350a)

This stream is a perennial stream with extremely poor habitat development and no sinuosity where the Alternatives cross this stream. This stream is recovering from previous channelization due to agricultural practices. The substrate consists of sand. The stream has a no riparian corridor due to row crops planted up to the tops of banks. The QHEI score of 30 is indicative of a limited water resource.

Jordan Creek (S5-s350b, S5-s350c, and S5-s350d)

Segment S5-s350b is upstream of the existing SR 37 bridge, S5-s350c is the portion of stream being bridged, and S5-s350d is downstream of the existing bridge. This stream is recovering from previous channelization due to agricultural practices. This stream is a perennial stream with poor habitat development and no sinuosity where the Alternatives cross this stream. The predominant substrate consists of silt. The stream has a very narrow riparian corridor associated with both banks. There is no riparian corridor associated with the segment under the bridge. The adjacent floodplain consists of row crops. The QHEI score of 24 is indicative of a limited water resource.

Buckner Branch (S5-s351a and S5-s351c)

Segment S5-s351a is upstream of the existing SR 37 bridge and S5-s351c is downstream of the bridge. These stream segments have exhibited no recovery from past channelization due to agricultural practices. This stream is an intermittent stream with poor habitat development and no sinuosity where the Alternatives cross this stream. The predominant substrate consists of gravel and sand. There is no riparian buffer associated with these segments of Buckner Branch. The adjacent floodplain consists of row crops. The QHEI score of 31 is indicative of a limited water resource.

The numbers of stream crossings impacted by the Alternatives varied, with Alternatives 4 and 5 being similar, at 450 stream segments for Alternative 4 and 445 stream segments for Alternative 5. Stream crossings impacted by Alternatives 6, 7, 8, and Refined Preferred Alternative 8 were similar at 386 stream segments for Alternative 6, 389 stream segments for Alternative 7, 391 stream segments for Alternative 8, and 378 stream segments for Refined Preferred Alternative 8. The linear feet of impact totals associated with the Alternatives also varied with Alternatives 4 and 5 being similar at 106,445 for Alternative 4, and 103,165 for Alternative 5. Total linear feet of impacts for Alternatives 6, 7, 8, and Refined Preferred Alternative 8 were also similar at 85,192 for Alternative 6, 83,291 for Alternative 7, 86,404 for Alternative 8, and 80,582 for Refined Preferred Alternative 8. Stream acreage impact totals associated with the Alternatives are varied with Alternatives 4 and 5 being similar at 13.57 for Alternative 4 and 13.59 for Alternative 5. Stream acreage impact totals for Alternatives 6, 7, 8, and Refined Alternative 8 are similar at 11.49 for Alternative 6, 11.23 for Alternative 7, 11.70 for

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Alternative 8, and 10.24 for Refined Preferred Alternative 8. The area of impacts to streams was calculated by multiplying the width of the Ordinary High Water Mark (OHWM) by the length of the impacts for each alternative, then dividing by 43,560 to convert square feet into acres. The number of impacted segments, linear feet of impact and acres of impact for ephemeral, intermittent, and perennial streams are shown in **Table 1**. In addition, **Table 1** differentiates those impacts within the existing rights-of-way for SR 37 and other existing transportation facilities from those which occur elsewhere.

Table 1 – Number of Impact Locations, Linear Feet (lf) of Stream Impact and Acres of Stream Impact by USGS Stream Type and Alternative

USGS Stream Type	Impact	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8	RPA 8
Ephemeral	Number	392	387	329	333	336	326
	Linear Feet	87,432	83,795	68,414	66,804	69,506	65,692
	Acres	7.25	6.91	5.46	5.38	5.60	5.34
Intermittent	Number	35	37	34	35	34	35
	Linear Feet	14,984	14,816	12,915	12,636	13,067	11,862
	Acres	2.84	2.77	2.55	2.47	2.55	2.27
Perennial	Number	23	21	23	21	21	17
	Linear Feet	4,029	4,554	3,863	3,851	3,831	3,028
	Acres	3.48	3.91	3.48	3.38	3.55	2.63
TOTAL	Number	450	445	386	389	391	378
	Linear Feet	106,445	103,165	85,192	83,291	86,404	80,582
	Acres	13.57	13.59	11.49	11.23	11.7	10.24
Impacts within SR 37 ROW	Number	317	317	320	320	320	320
	Linear Feet	67,833	67,875	68,832	68,834	68,835	68,815
	Acres	8.77	8.79	8.83	8.83	8.83	8.83
Percent of New Impacts	Number	30%	29%	17%	18%	18%	15%
	Linear Feet	36%	34%	19%	17%	20%	15%
	Acres	35%	35%	23%	21%	25%	14%

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1.4.2 QHEI and HHEI Score Trends

QHEI and HHEI scores for the streams crossed by the Section 5 Alternatives were very similar. The average QHEI scores for the Alternatives were; 45.08 for Alternative 4, 43.28 for Alternative 5, 44.29 for Alternative 6, 44.08 for Alternative 7, 43.98 for Alternative 8 and 43.19 for Refined Preferred Alternative 8. Average HHEI scores were; 29.99 for Alternative 4, 29.89 for Alternative 5, 28.85 for Alternative 6, 28.87 for Alternative 7, 28.94 for Alternative 8, and 28.68 for Refined Preferred Alternative 8.

In consideration of the QHEI and HHEI scores of stream segments affected by the Alternatives, a weighted comparison of stream impacts was made by summing the values of stream impact lengths multiplied by habitat evaluation score, and then comparing those sums as percentages against the Refined Preferred Alternative 8. For comparison purposes, Refined Preferred Alternative 8 was assigned the value of 100%. Weighted stream impact values for all other Alternatives fell within the range of 100% to 158% for HHEI evaluated streams and between 100% and 153% for QHEI evaluated streams, demonstrating that the Alternatives affect streams of generally similar quality for the larger perennial streams with a wider range for the project area's smaller headwater streams. Refer to **Table 2** for a summary of stream impacts, weighted by habitat evaluation score.

Table 2 – Summary of Stream Impacts, Weighted by Habitat Evaluation Score

Habitat Eval. / Score Ranges	Alternatives - Linear Feet of Impact					
	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8	RPA 8
HHEI Streams						
0 - 40	59,526	56,135	47,254	46,198	48,032	44,946
41 - 59	12,859	12,253	8,787	7,439	9,107	7,435
60 - 100	10,160	10,248	6,174	6,874	6,286	6,040
Totals	82,545	78,636	62,215	60,511	63,425	58,421
QHEI Streams						
0 - 50	3,129	3,607	2,851	2,884	2,786	2,388
51 - 64	1,523	1,620	1,444	1,198	1,487	1,081
> 64	120	176	116	300	108	108
Totals	4,772	5,403	4,411	4,382	4,381	3,577
Impact Lengths Multiplied by Habitat Evaluation Score, Percent Comparison						
HHEI	2,638,024	2,531,726	1,826,432	1,773,555	1,872,304	1,673,398
	158%	151%	109%	106%	112%	100%
QHEI	202,777	225,657	191,322	188,711	188,522	147,562
	137%	153%	130%	128%	128%	100%

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Stream Assessment Report, Section 5



1.5 SUMMARY

The impacted stream segment totals associated with the Alternatives are varied, with Alternatives 4 and 5 being similar in impacts and Alternatives 6, 7, 8, and Refined Preferred Alternative 8 being similar. Alternative 4 would have the highest number of impacted segments with 450. Refined Preferred Alternative 8 would have the fewest number of impacts with 378. This is approximately a 16% difference.

Total stream impact lengths associated with the Alternatives were also varied, with Alternatives 4 and 5 being similar and Alternatives 6, 7, 8, and Refined Preferred Alternative 8 being similar. Refined Preferred Alternative 8 would cause the least potential total linear stream impact at 80,582 linear feet, including previously disturbed segments. Alternative 4 would have the highest number of total linear stream impact at 106,445 linear feet of impacts, including previously disturbed segments. The difference between the least amount of impacts (Refined Preferred Alternative 8) and Alternative 4 is 25,863 linear feet. This is approximately a 24% difference.

Weighted stream impact values for the Alternatives fell within the range of 100% to 158% for HHEI evaluated streams and between 100% and 153% for QHEI evaluated streams, demonstrating that the Alternatives affect streams of generally similar quality for the larger perennial streams with a wider range for the project area's headwater streams.

A summary of stream impact data associated with the Section 5 Alternatives is presented in **Table 3**. **Table 4** presents the potential structure sizes and locations for the Refined Preferred Alternative 8.

Table 3 – Stream Impact Data Summary

Impact	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8	RPA 8
Stream Crossing Locations	450	445	386	389	391	378
Stream Impact (LF)	106,445	103,165	85,192	83,291	86,404	80,582
Acres of Stream Impact	13.57	13.59	11.49	11.23	11.70	10.24
Average HHEI Score	29.99	29.89	28.85	28.87	28.94	28.68
Weighted Impact Comparison	158%	151%	109%	106%	112%	100%
Average QHEI Score	45.08	43.28	44.29	44.08	43.98	43.19
Weighted Impact Comparison	137%	153%	130%	128%	128%	100%

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Table 4 – Stream ID and Bridge Size and Location for the Refined Preferred Alternative 8

Mainline Station at Road	County	Structure Type	Description/Location	Approx. Skew (deg.)	Bridge Length (Ft.)	No. Span	Stream ID #
MAINLINE Structures							
1997+30	Monroe	Bridge	I-69 NB over Griffy Creek	15	283	5	S5-s065
1997+48	Monroe	Bridge	I-69 SB over Griffy Creek	15	283	5	S5-s065
2010+17	Monroe	Bridge	I-69 NB over Beanblossom Creek	50	292.5	3	S5-s081
2009+37	Monroe	Bridge	I-69 SB over Beanblossom Creek	50	292.5	3	S5-s081
2039+50	Monroe	Bridge	I-69 NB over Beanblossom Overflow	0	153	4	S5-s081
2039+50	Monroe	Bridge	I-69 SB over Beanblossom Overflow	0	153	4	S5-s081
2412+88	Monroe	Bridge	I-69 NB over Bryants Creek	45	142.4	3	S5-s288
2411+98	Monroe	Bridge	I-69 SB over Bryants Creek	45	142.5	3	S5-s288
2570+36	Morgan	Bridge	I-69 NB over Little Indian Creek	10	75	1	S5-s345
2570+52	Morgan	Bridge	I-69 SB over Little Indian Creek	10	75	1	S5-s345
2603+48	Morgan	Bridge	I-69 NB over Jordan Creek	0	58	1	S5-s350
2603+45	Morgan	Bridge	I-69 SB over Jordan Creek	0	58	1	S5-s350
2603+45	Morgan	Bridge	Liberty Church SB Exit Ramp over Jordan Creek	11	58	1	S5-s350
ACCESS RD. Structures							
2570+59	Morgan	Bridge	West Access Road over Little Indian Creek	10	75	1	S5-s345
2603+54	Morgan	Bridge	Liberty Church West Access Road over Jordan Creek	0	58	1	S5-s350
2603+52	Morgan	Bridge	Liberty Church East Access Road over Jordan Creek	15	58	1	S5-s350

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REFERENCES

Indiana Department of Environmental Management, Office of Water Quality, Assessment Branch, Biological Studies Section. November 22, 2006. *Qualitative Habitat Evaluation Index (QHEI) Standard Operating Procedure*. Indianapolis, Indiana. S-001-OWQ-A-BS-06-S-R1.

Indiana Department of Environmental Management. Draft 2012 “303(d) List of Impaired Waters”, Online at <http://www.in.gov/idem/nps/2647.htm>. (Last accessed 3/25/13).

Indiana General Assembly Webpage: <http://www.in.gov/legislative/ic/code/> (Last accessed 3/25/13).

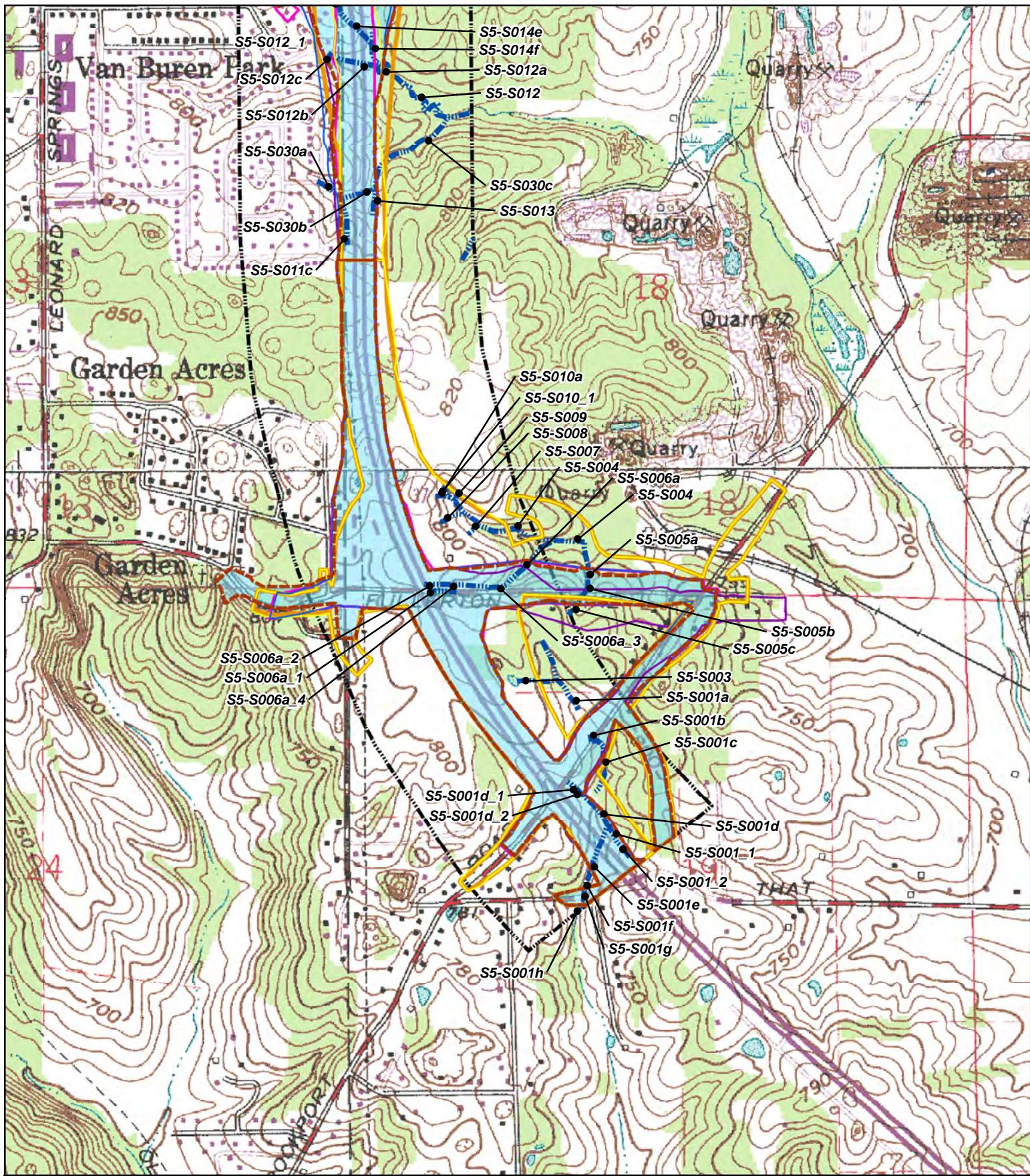
Ohio Environmental Protection Agency. October 2009. *Field Evaluation Manual for Ohio’s Primary Headwater Habitat Streams*. Columbus, Ohio.

Rankin, Edward T. November 1989. *The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods and Application*. Ohio Environmental Protection Agency, Division of Water Quality Planning and Assessment. Columbus, Ohio.

**I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES
Stream Assessment Report, Section 5**



FIGURES



Legend

- Yellow: Alternative 4
- Orange: Alternative 5
- Pink: Alternative 6
- Magenta: Alternative 7
- Blue: Alternative 8
- Red: Refined Preferred Alternative 8
- Black: Section 5 Corridor

0 0.25 mi

FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 1 of 14)



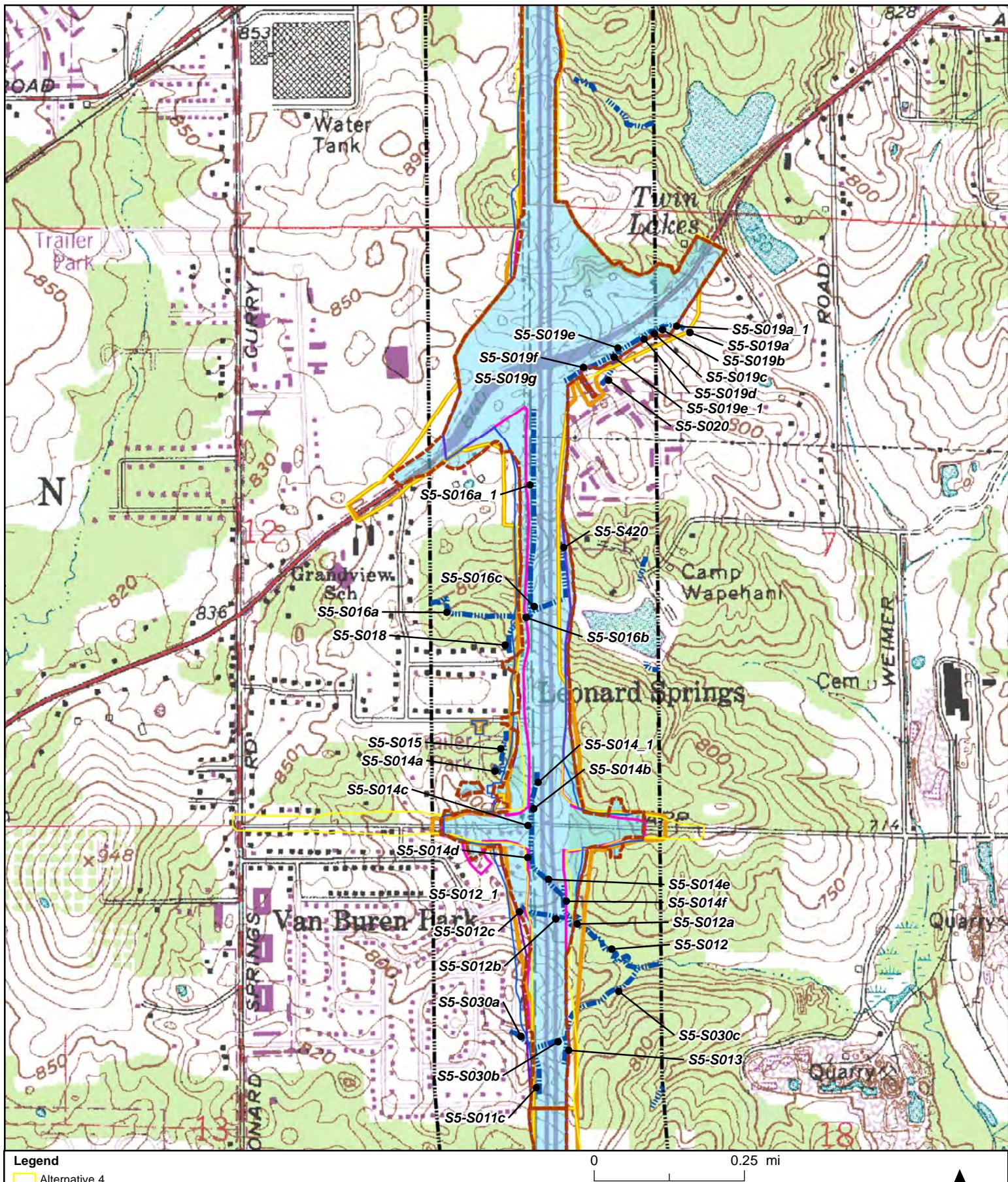


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 2 of 14)





Legend

- Yellow: Alternative 4
- Orange: Alternative 5
- Pink: Alternative 6
- Purple: Alternative 7
- Blue: Alternative 8
- Red: Refined Preferred Alternative 8
- Black: Section 5 Corridor

0 0.25 mi



FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 3 of 14)

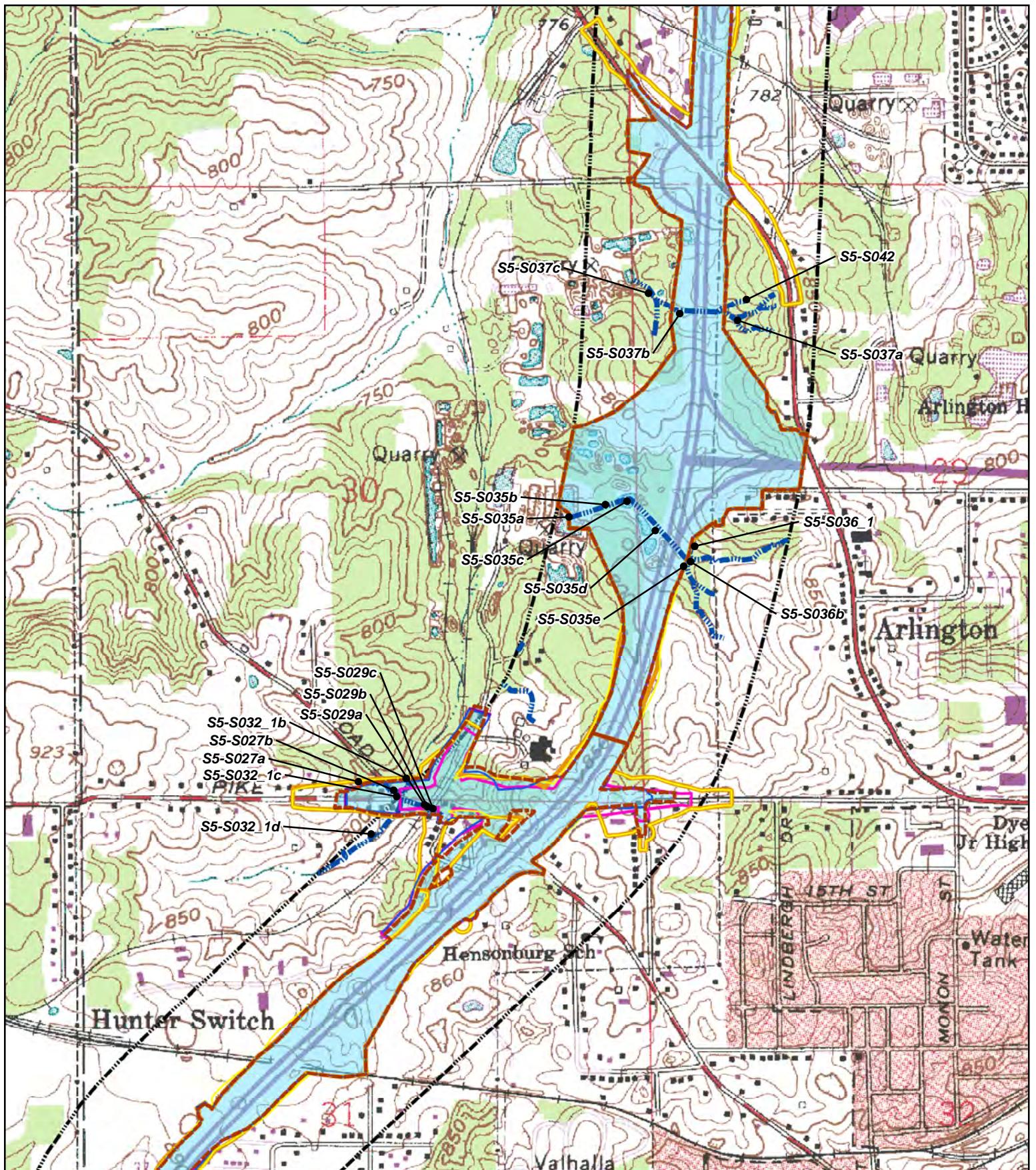
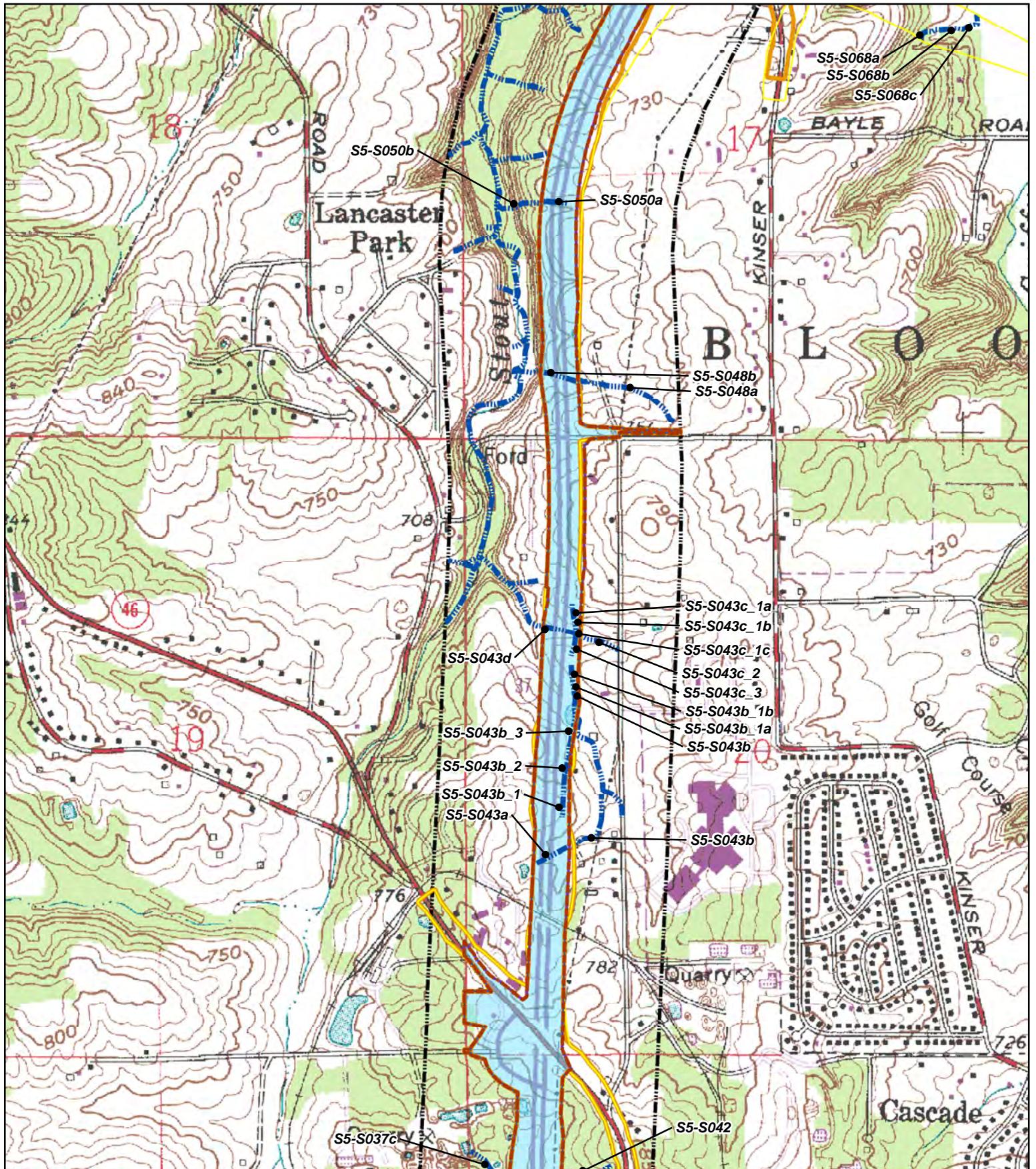


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 4 of 14)





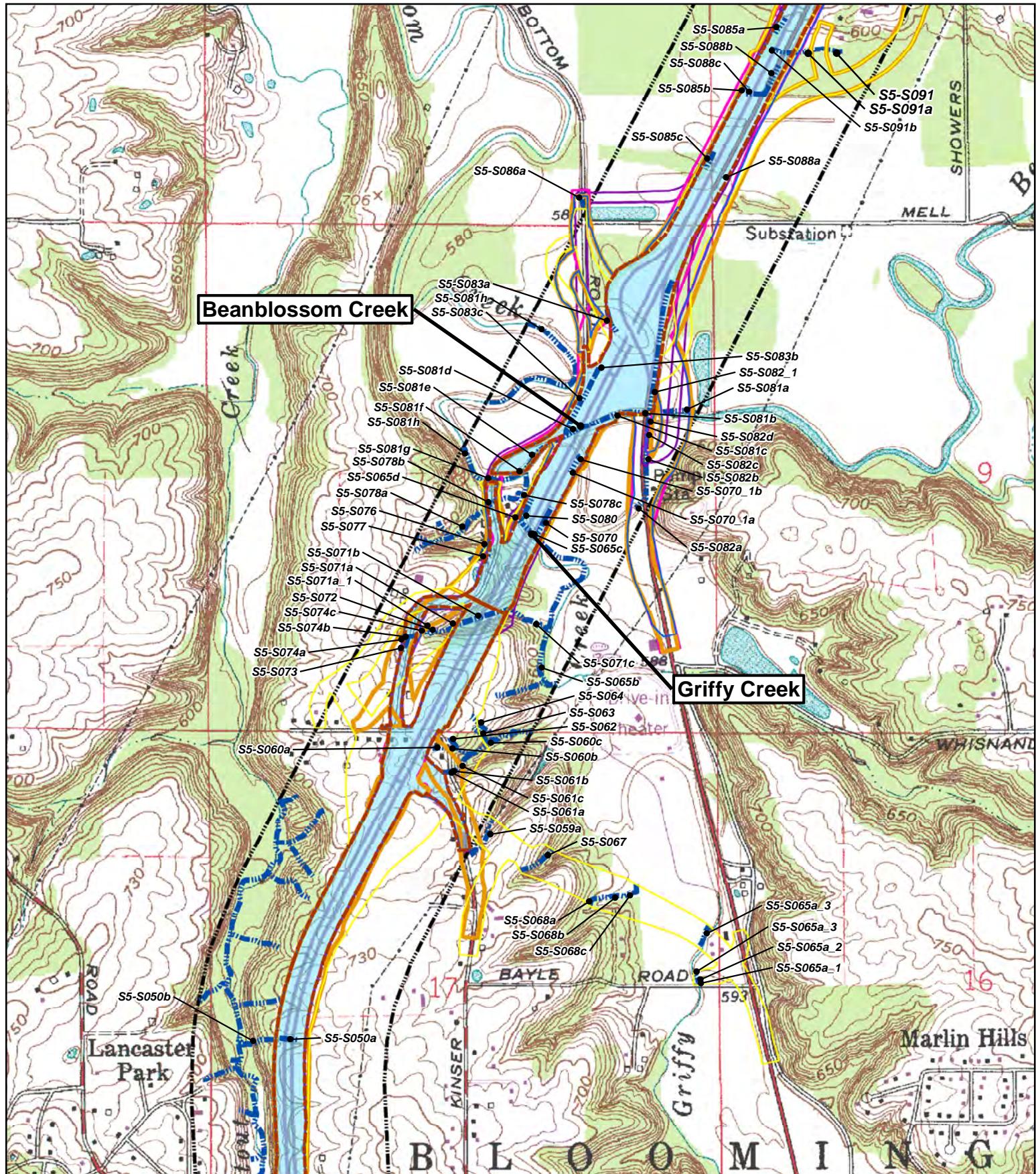
Legend

- Yellow: Alternative 4
- Orange: Alternative 5
- Pink: Alternative 6
- Purple: Alternative 7
- Blue: Alternative 8
- Red: Refined Preferred Alternative 8
- Dashed Line: Section 5 Corridor

FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5

Streams in Relation to the Alternatives on USGS Mapping
(Sheet 5 of 14)





**I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5**

**Streams in Relation to the Alternatives on USGS Mapping
(Sheet 6 of 14)**

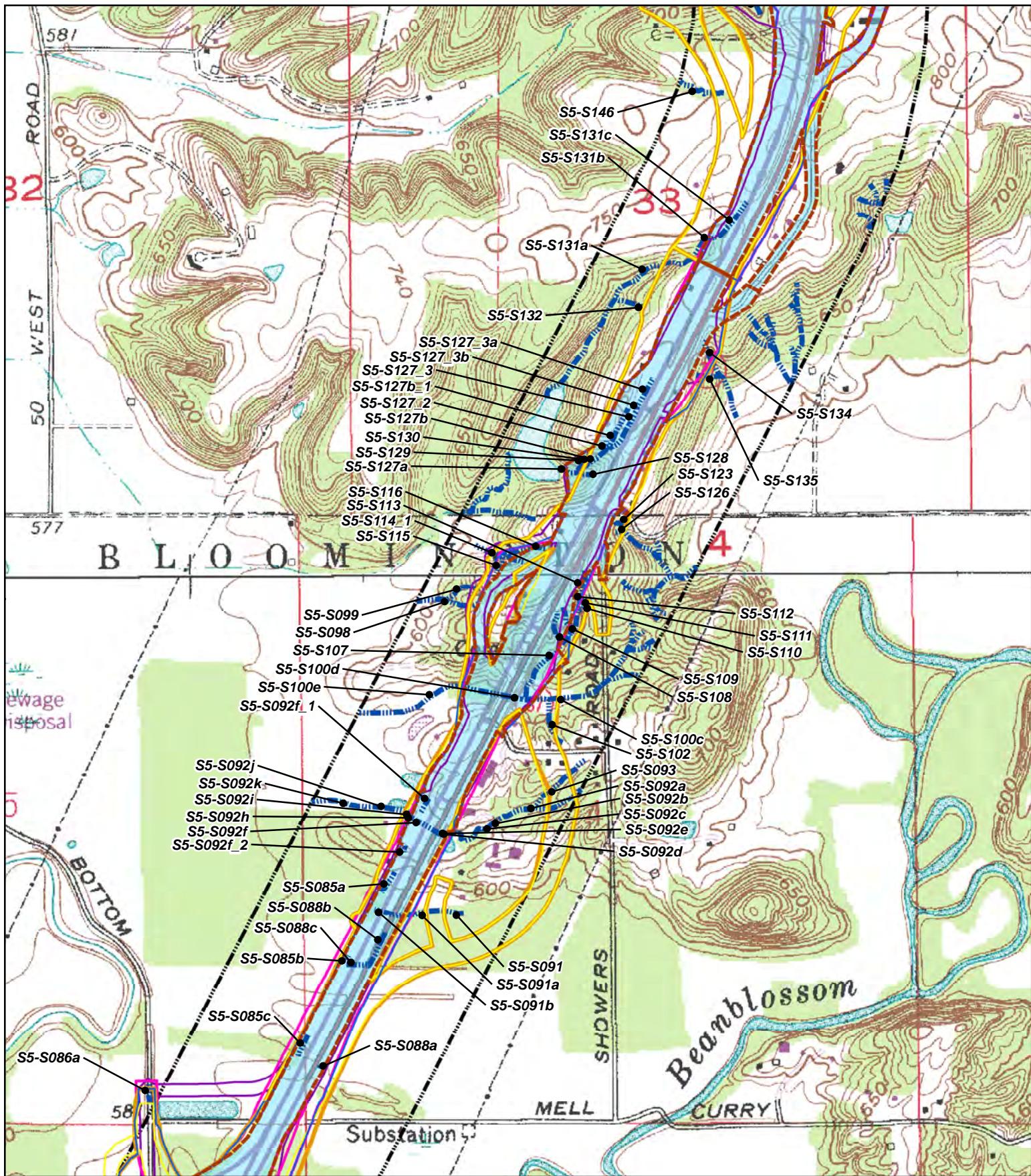


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 7 of 14)

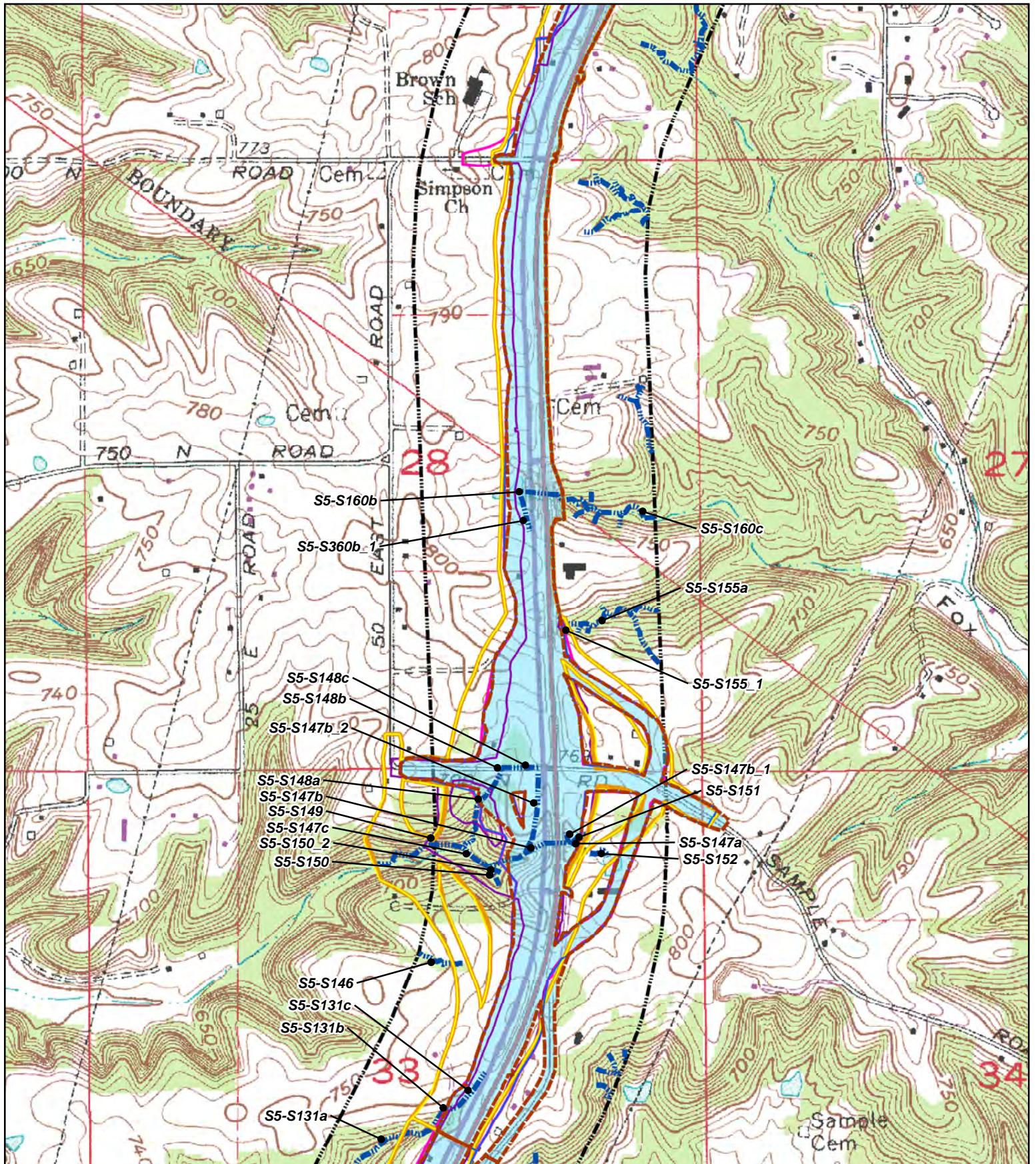


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 8 of 14)

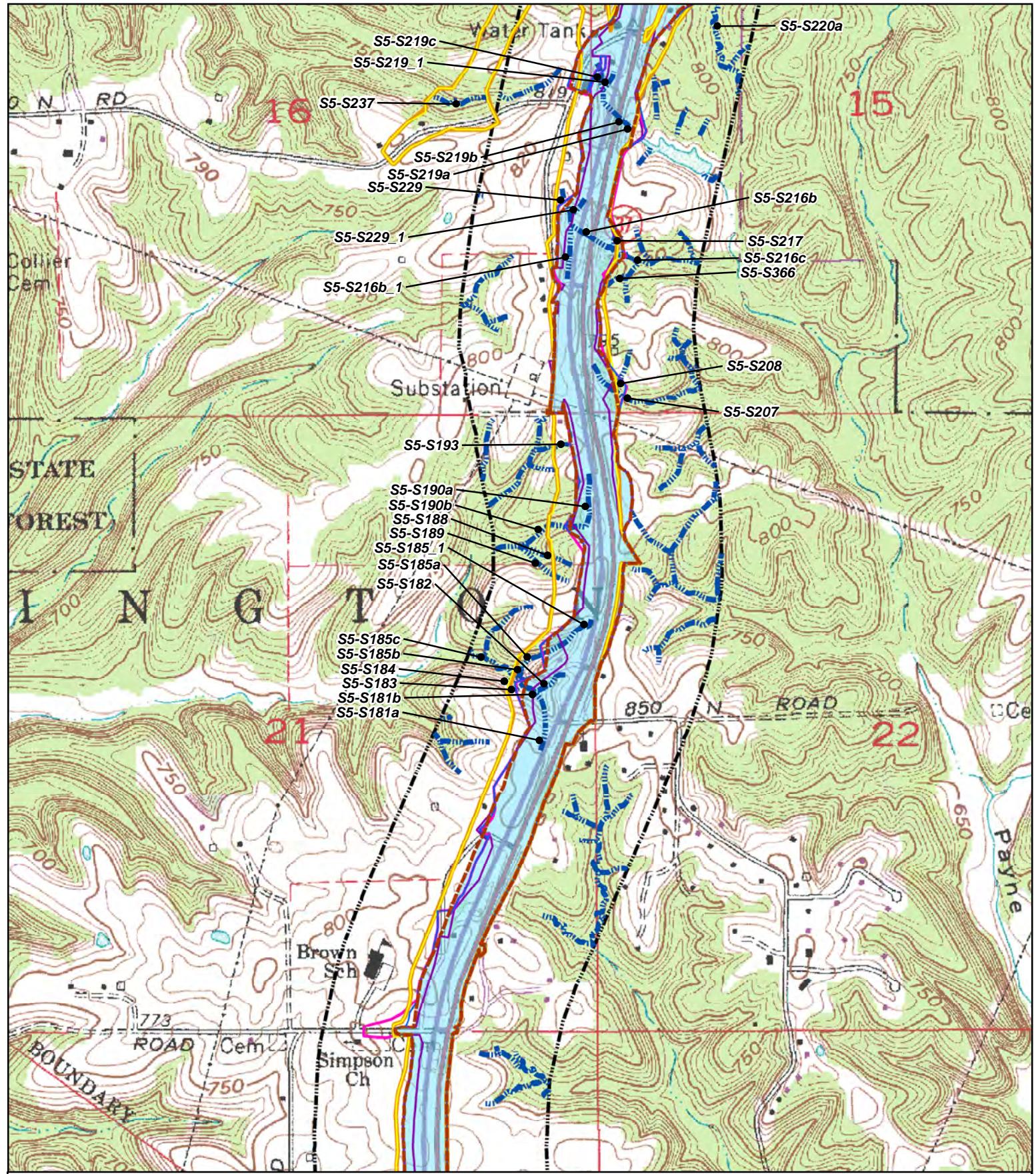


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
(Sheet 9 of 14)

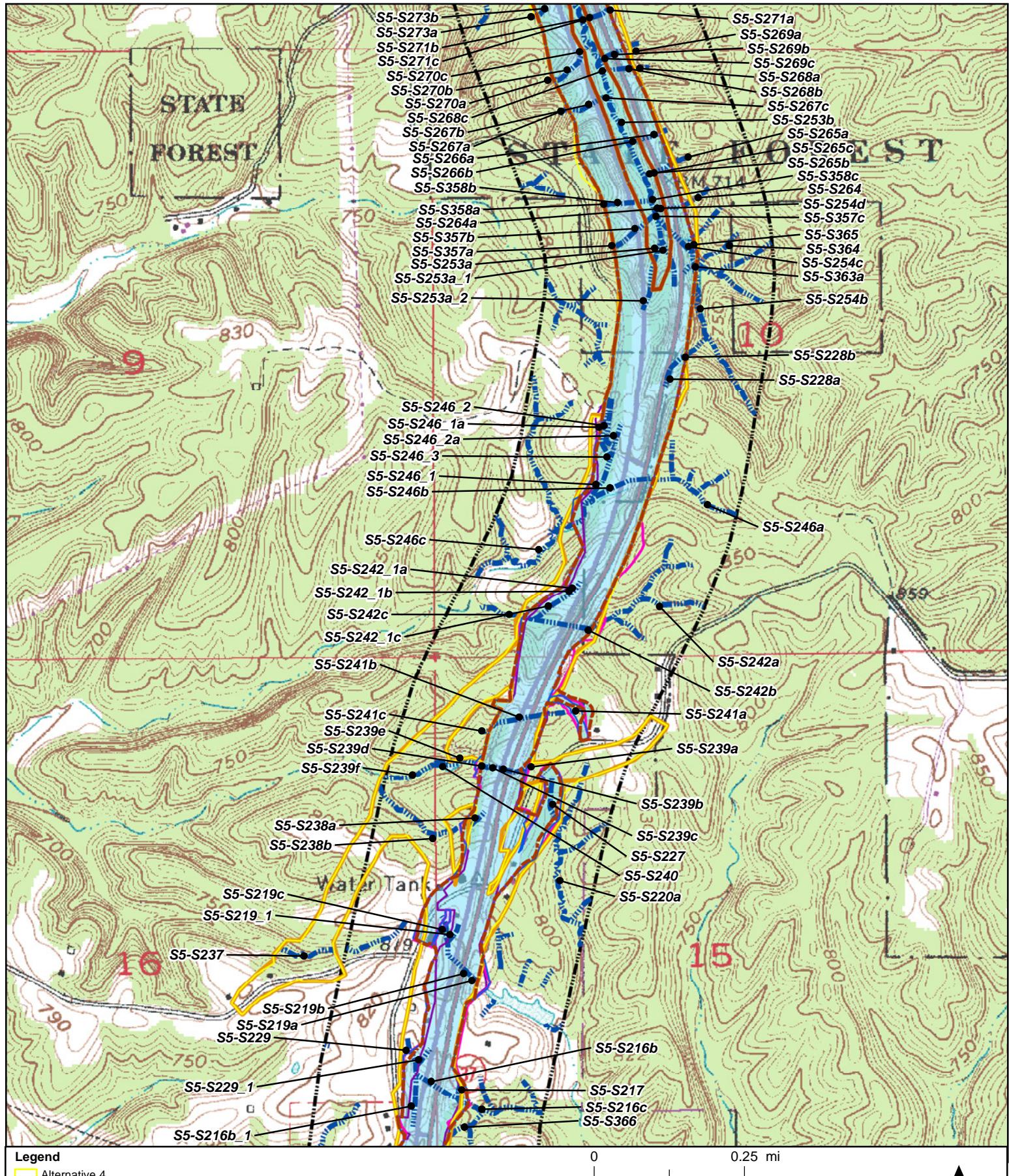
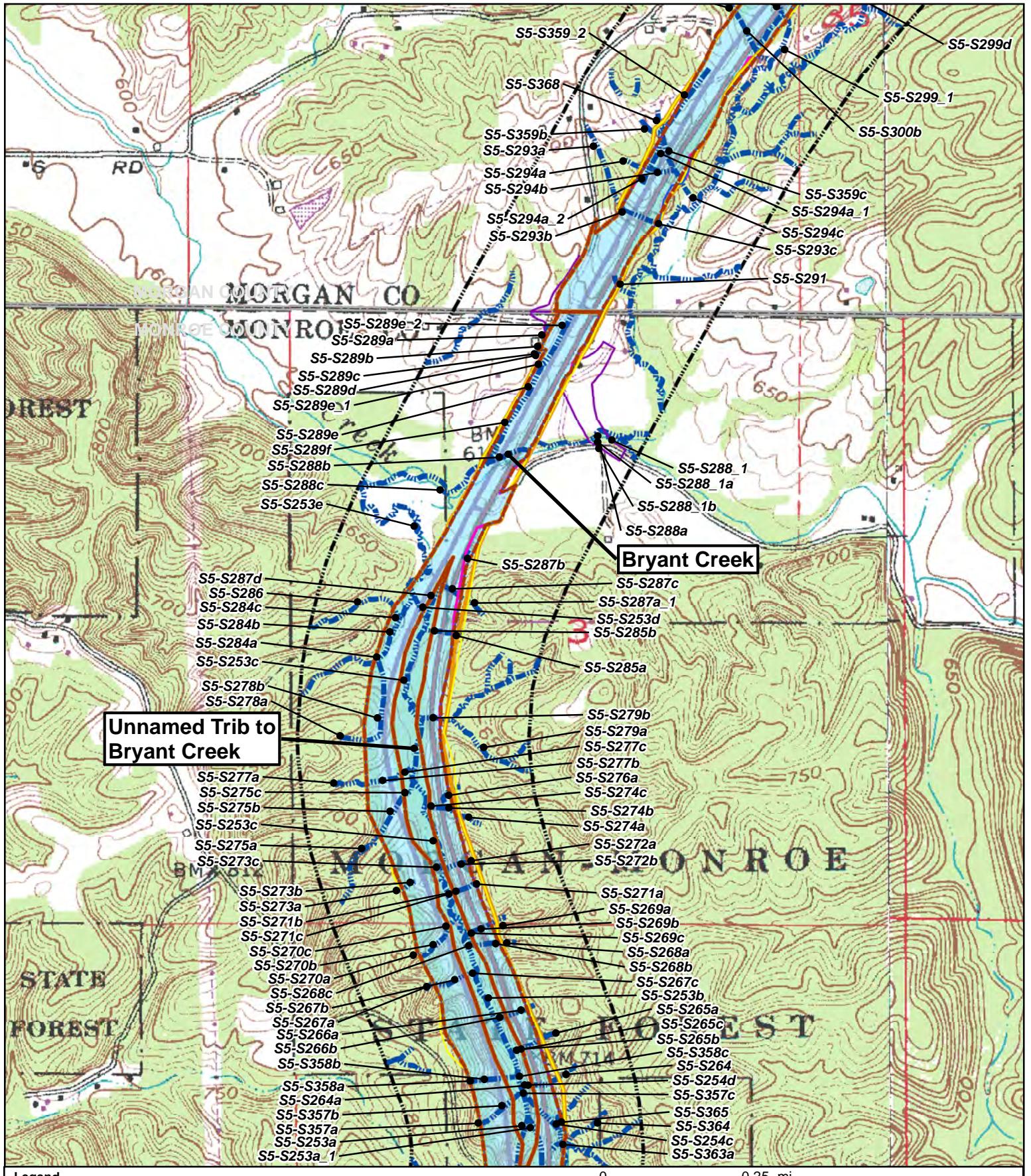


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5

Streams in Relation to the Alternatives on USGS Mapping
(Sheet 10 of 14)



Legend

- [Yellow Box] Alternative 4
- [Orange Box] Alternative 5
- [Pink Box] Alternative 6
- [Purple Box] Alternative 7
- [Blue Box] Alternative 8
- [Red Box] Refined Preferred Alternative 8
- [Black Box] Section 5 Corridor

0 0.25 mi



FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 11 of 14)

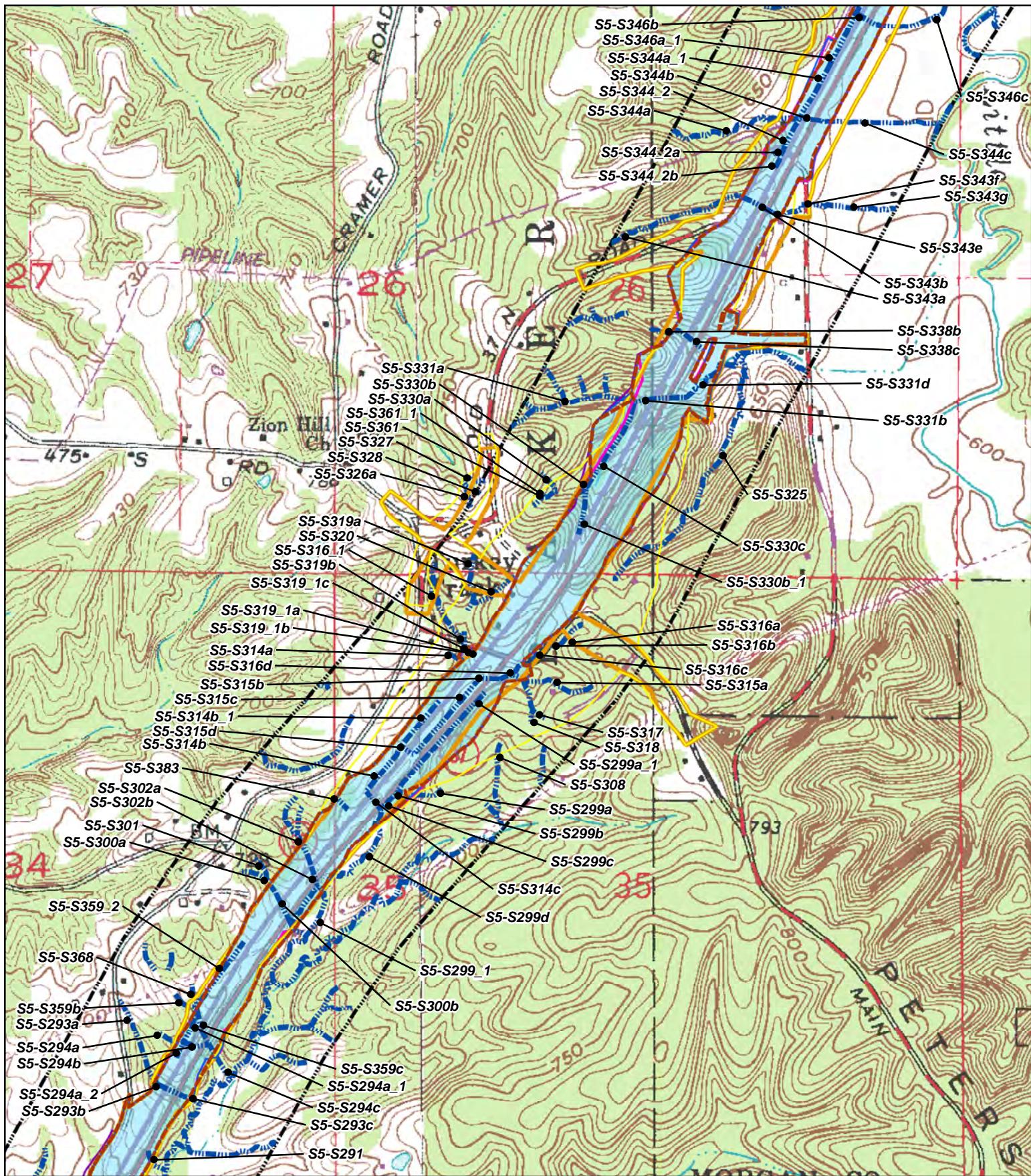


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 12 of 14)

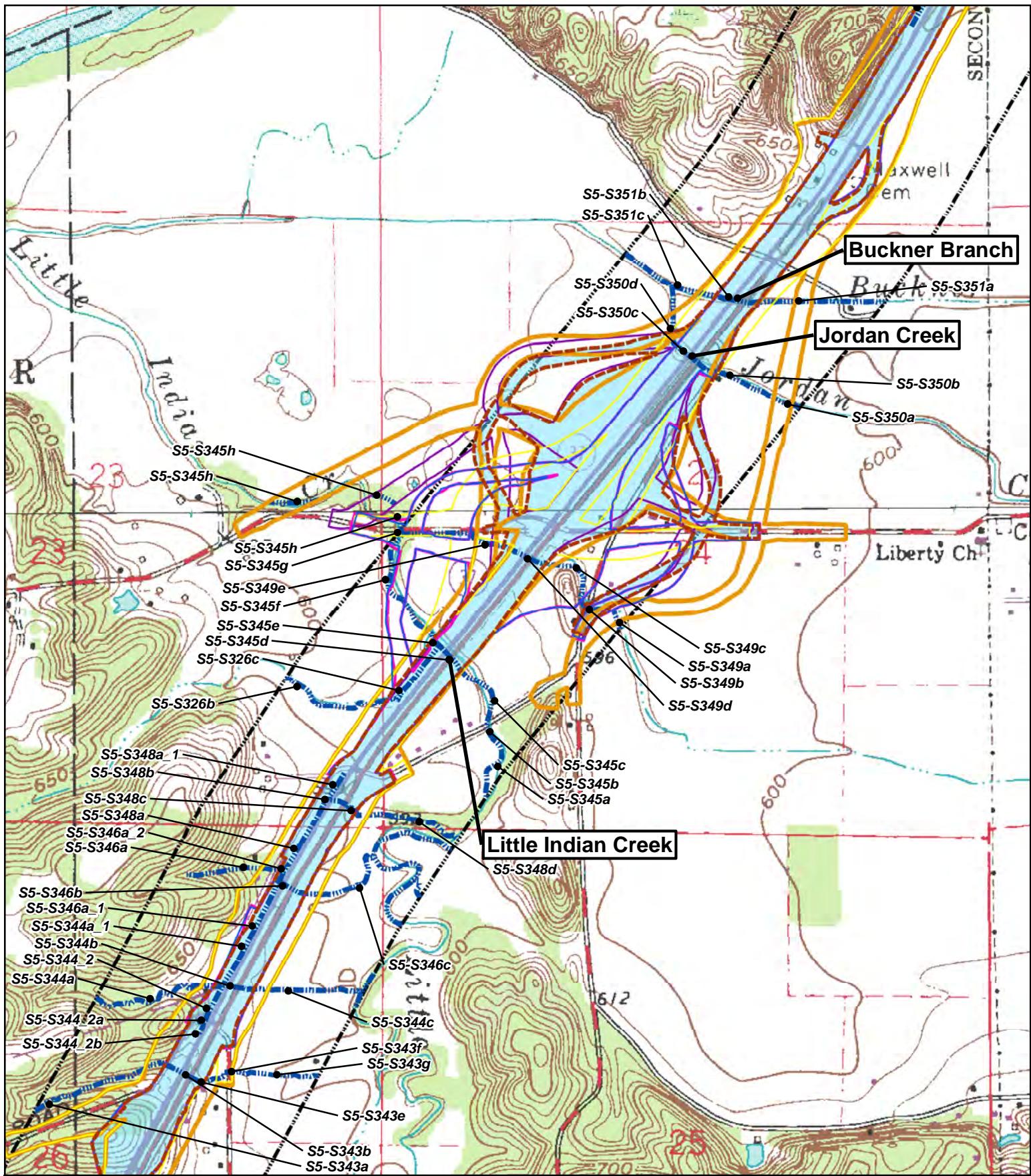


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 13 of 14)



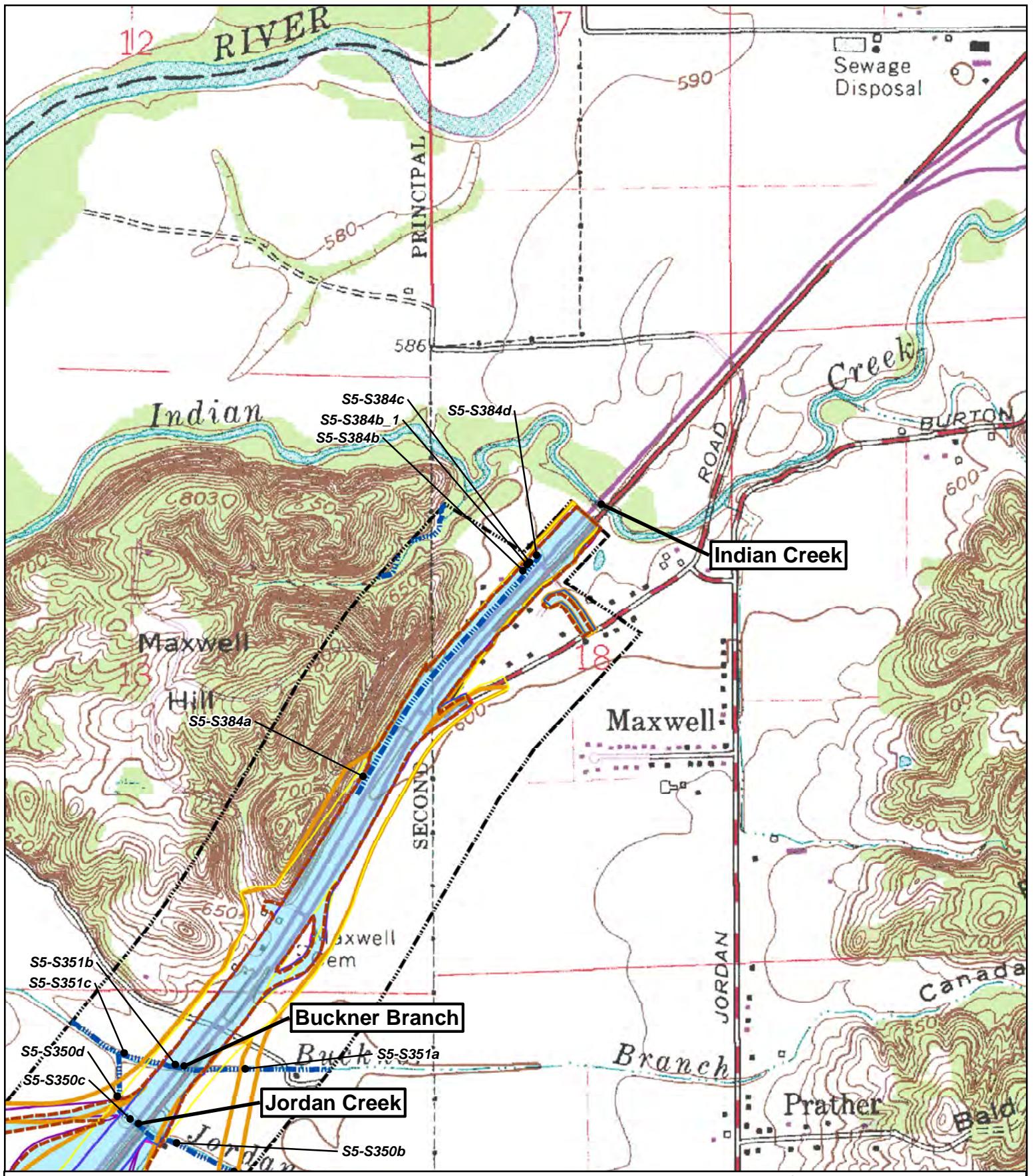


FIGURE 1
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on USGS Mapping
 (Sheet 14 of 14)



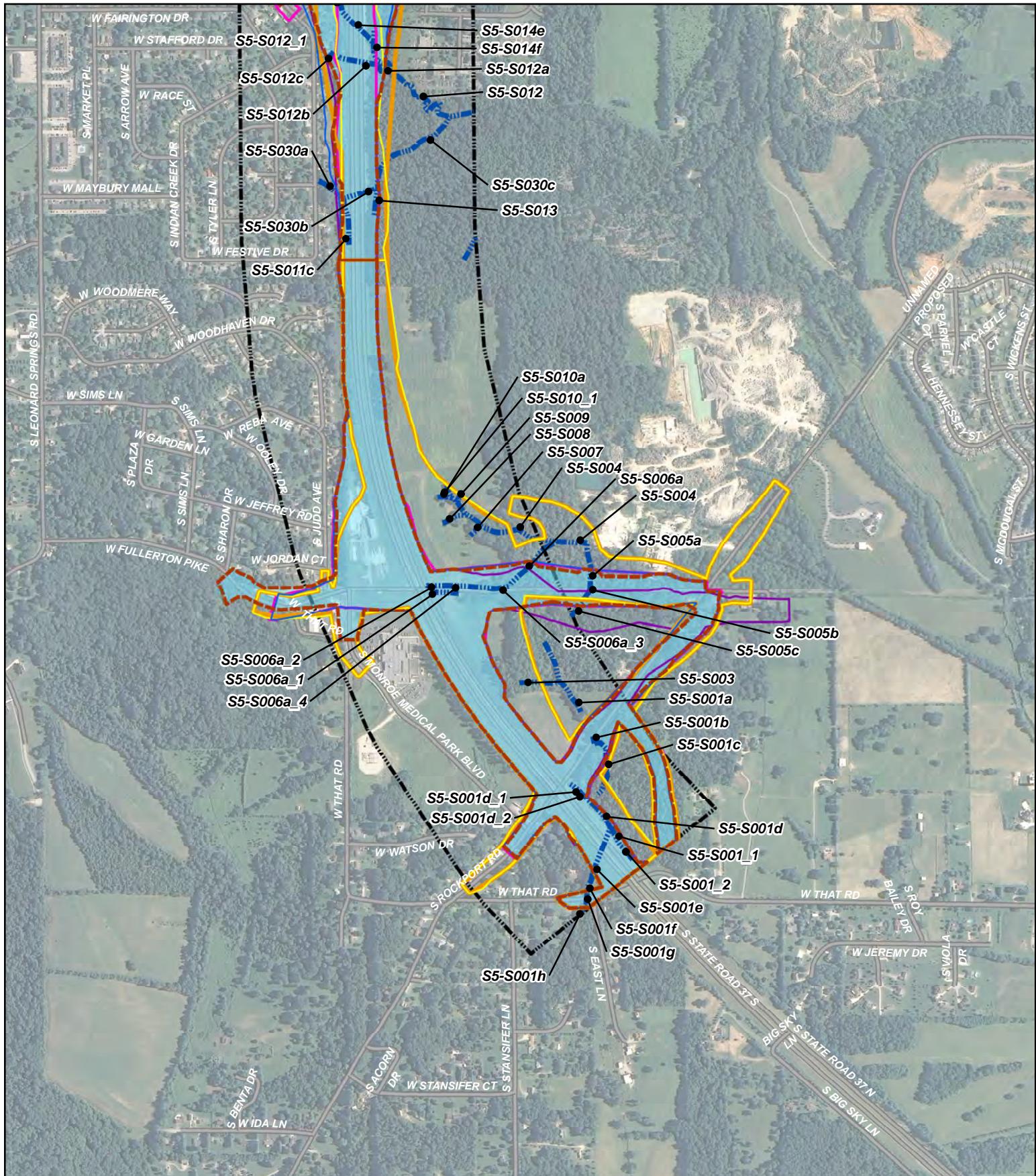


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
(Sheet 1 of 14)

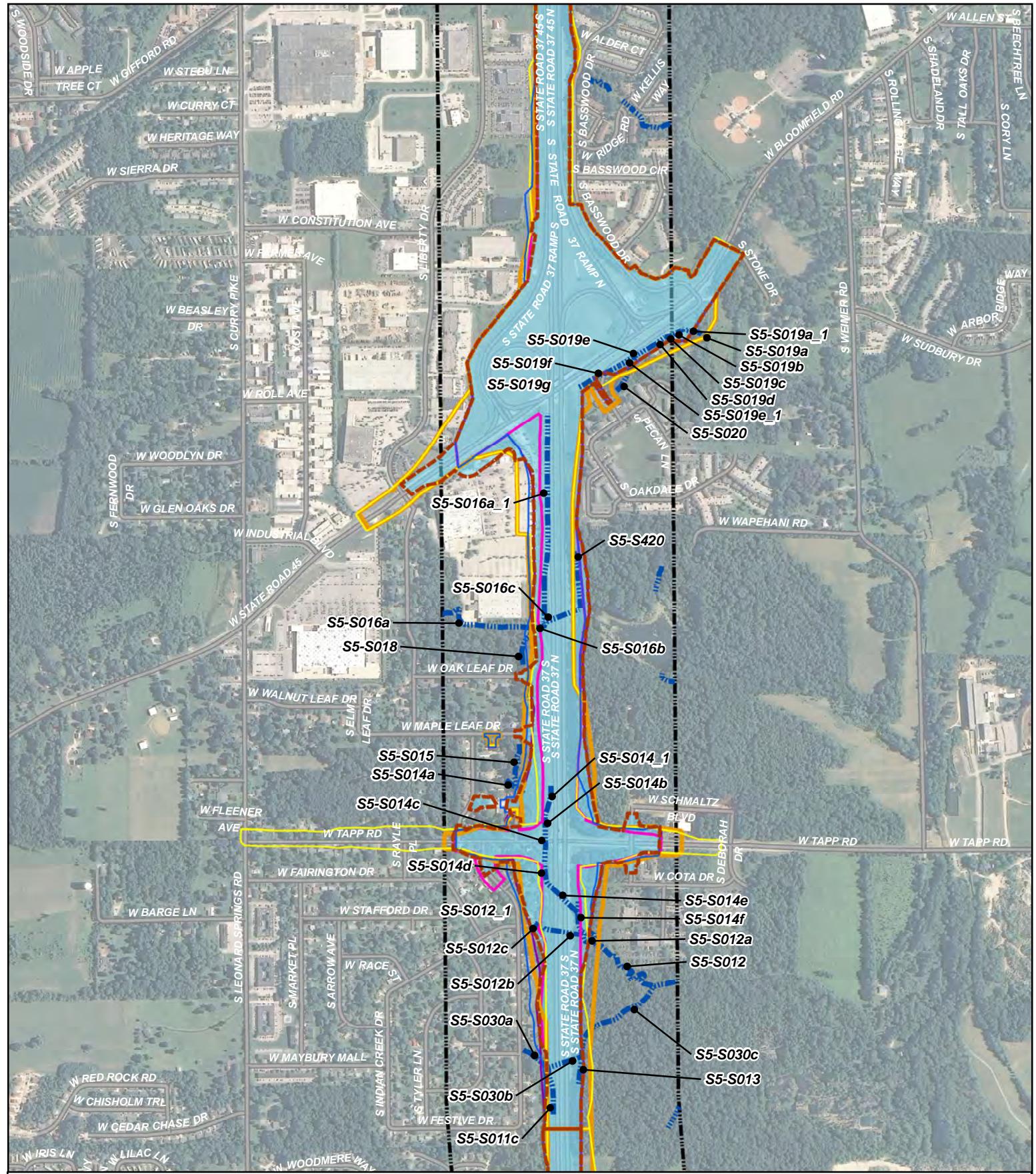
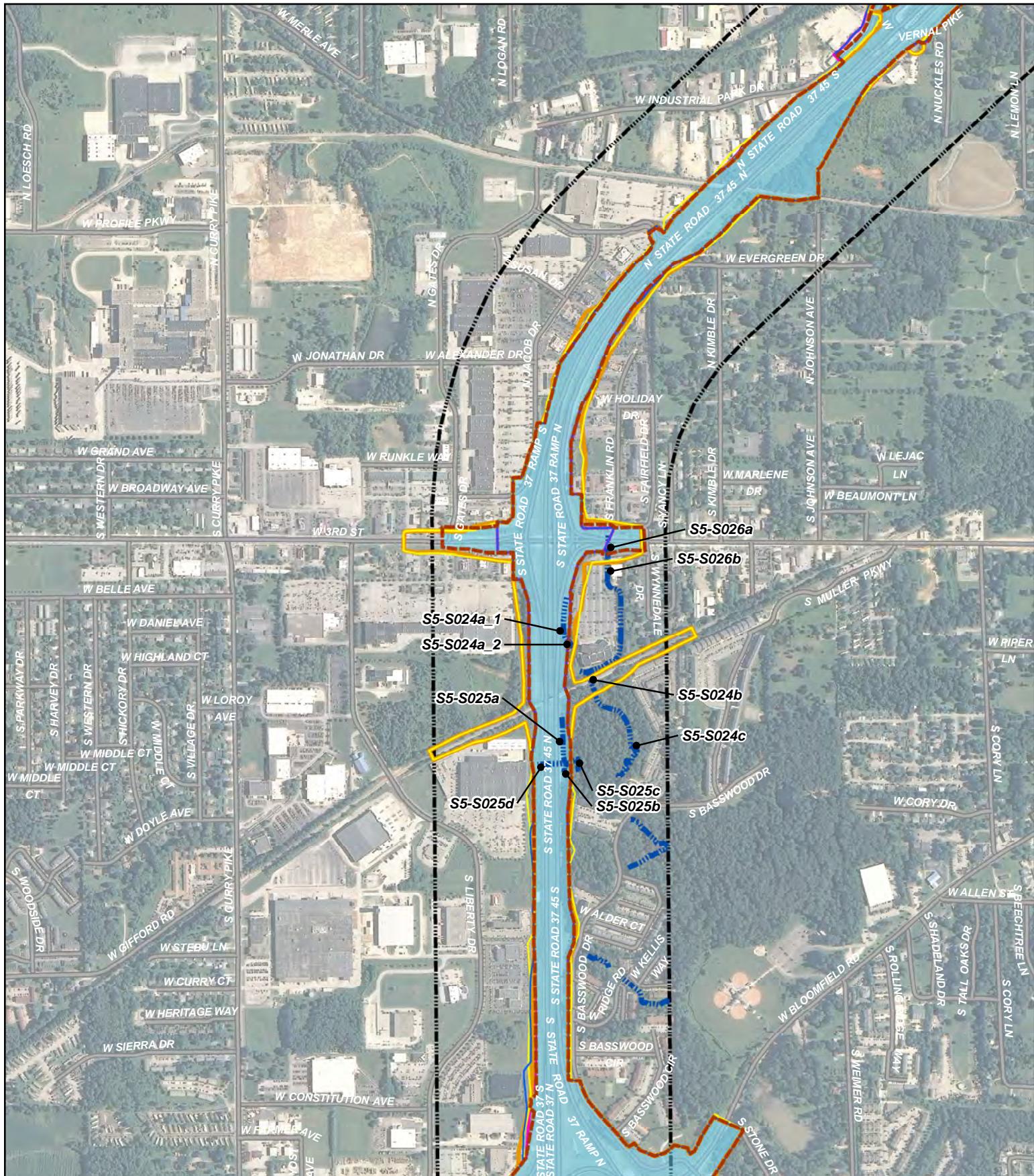


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5

Streams in Relation to the Alternatives on 2010 Aerial Mapping
(Sheet 2 of 14)





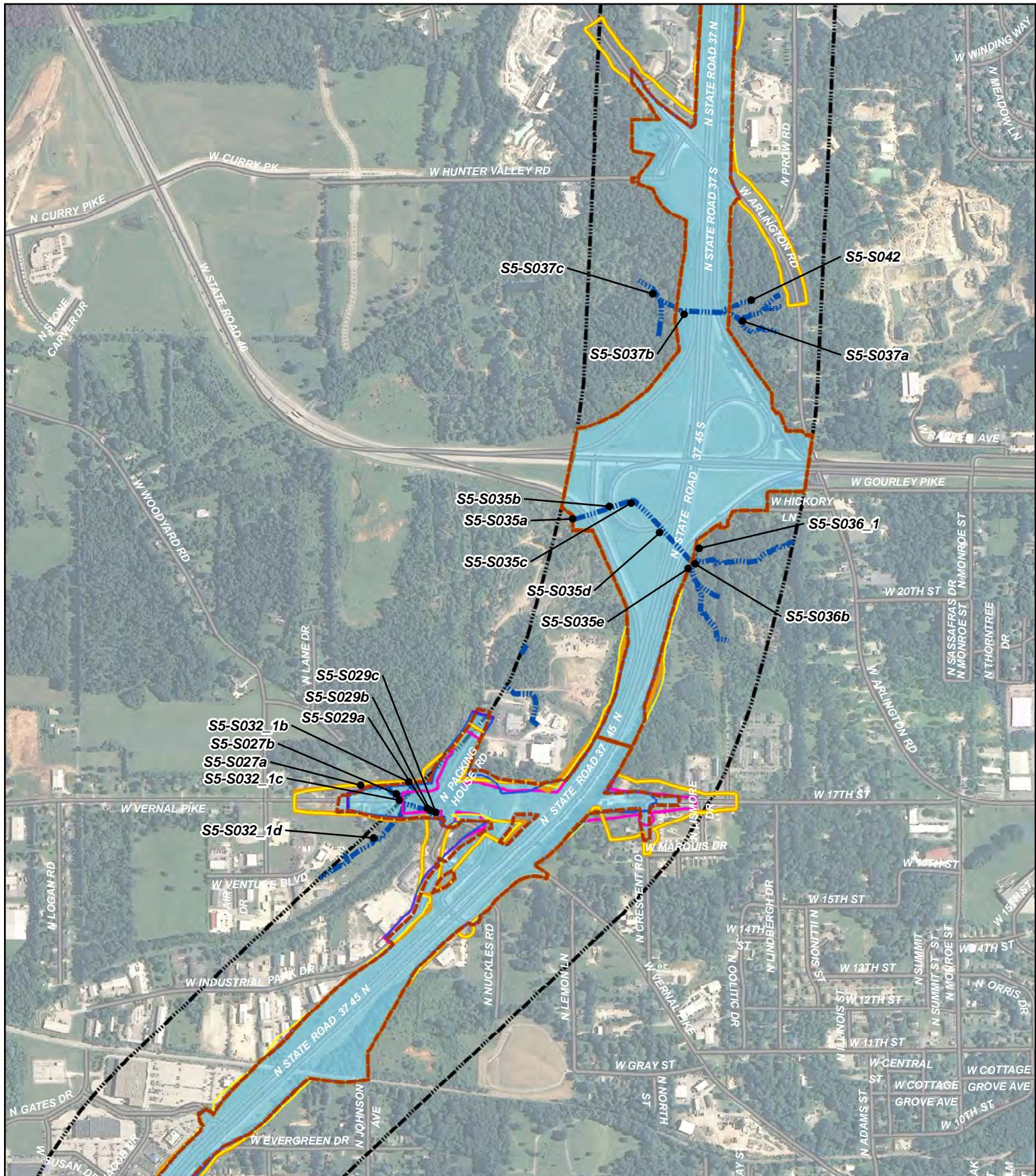
Legend

- Alternative 4
- Alternative 5
- Alternative 6
- Alternative 7
- Alternative 8
- Refined Preferred Alternative 8
- Section 5 Corridor

FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5

Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 3 of 14)





Legend

- Yellow Line: Alternative 4
- Orange Line: Alternative 5
- Pink Line: Alternative 6
- Magenta Line: Alternative 7
- Blue Line: Alternative 8
- Red Line with Blue Dots: Refined Preferred Alternative 8
- Black Line with Dashed Segments: Section 5 Corridor

FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5

Streams in Relation to the Alternatives on 2010 Aerial Mapping
(Sheet 4 of 14)

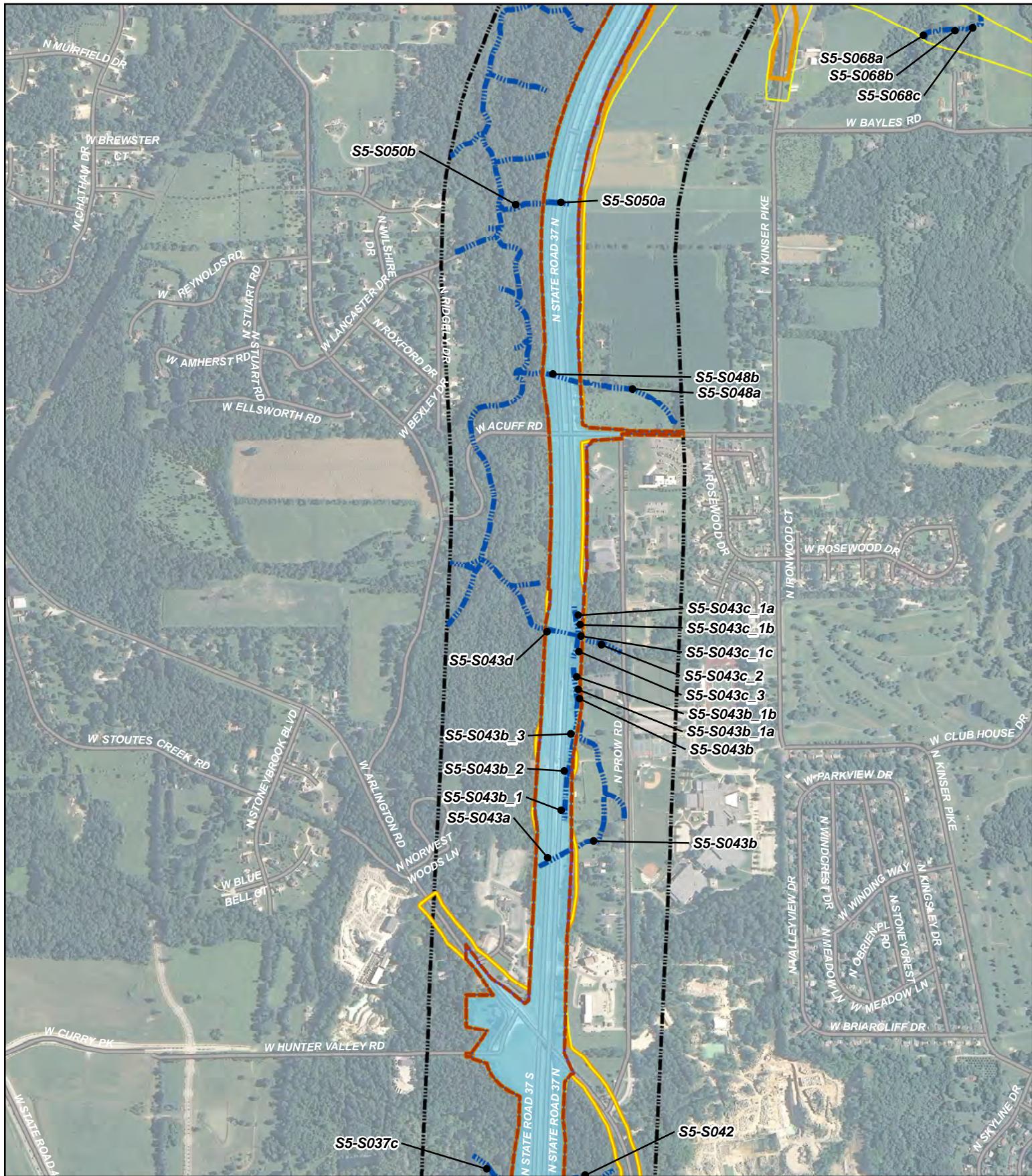


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 5 of 14)

Legend

- [Yellow Box] Alternative 4
- [Orange Box] Alternative 5
- [Pink Box] Alternative 6
- [Purple Box] Alternative 7
- [Blue Box] Alternative 8
- [Red Box] Refined Preferred Alternative 8
- [Black Line] Section 5 Corridor

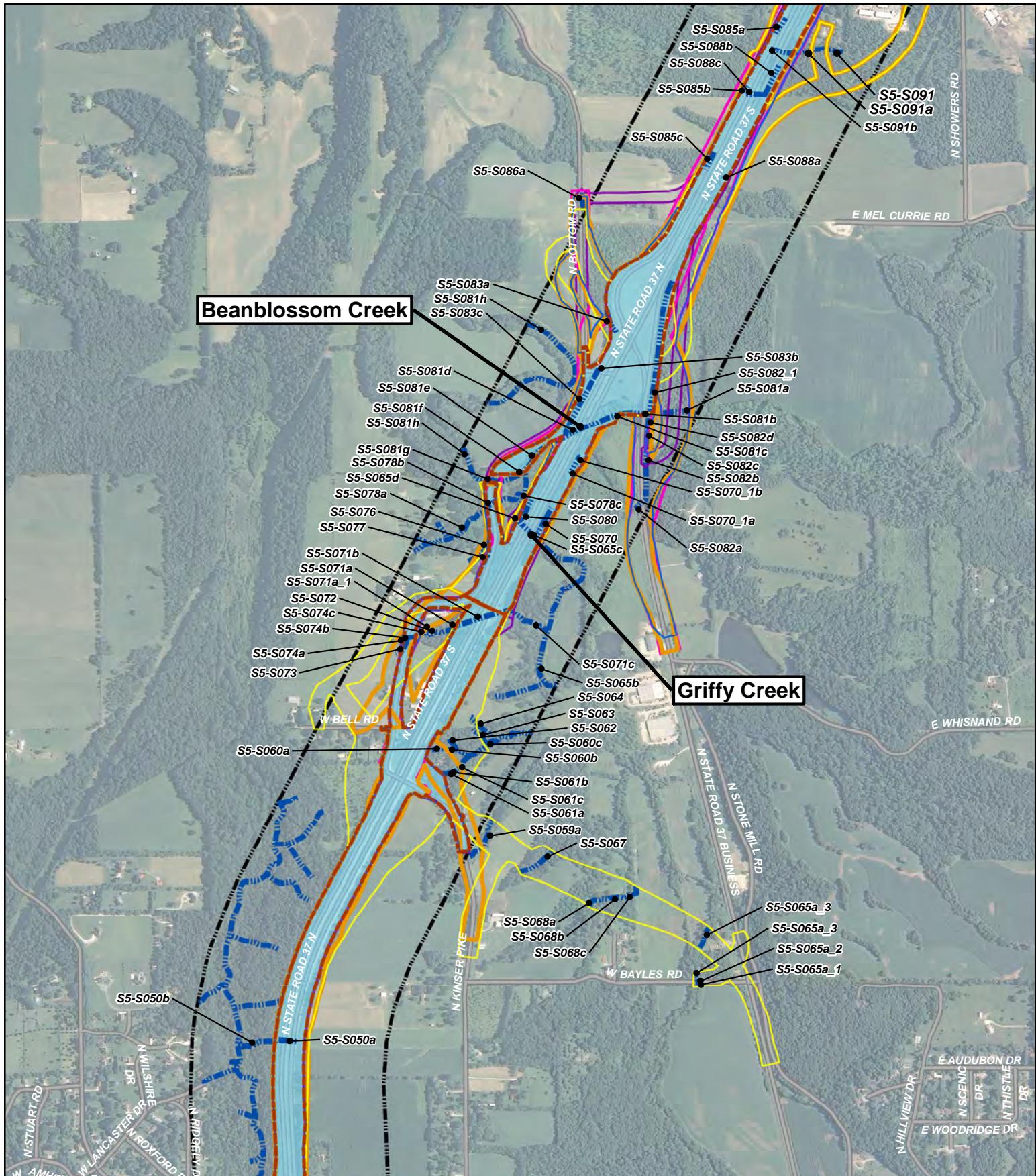


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 6 of 14)

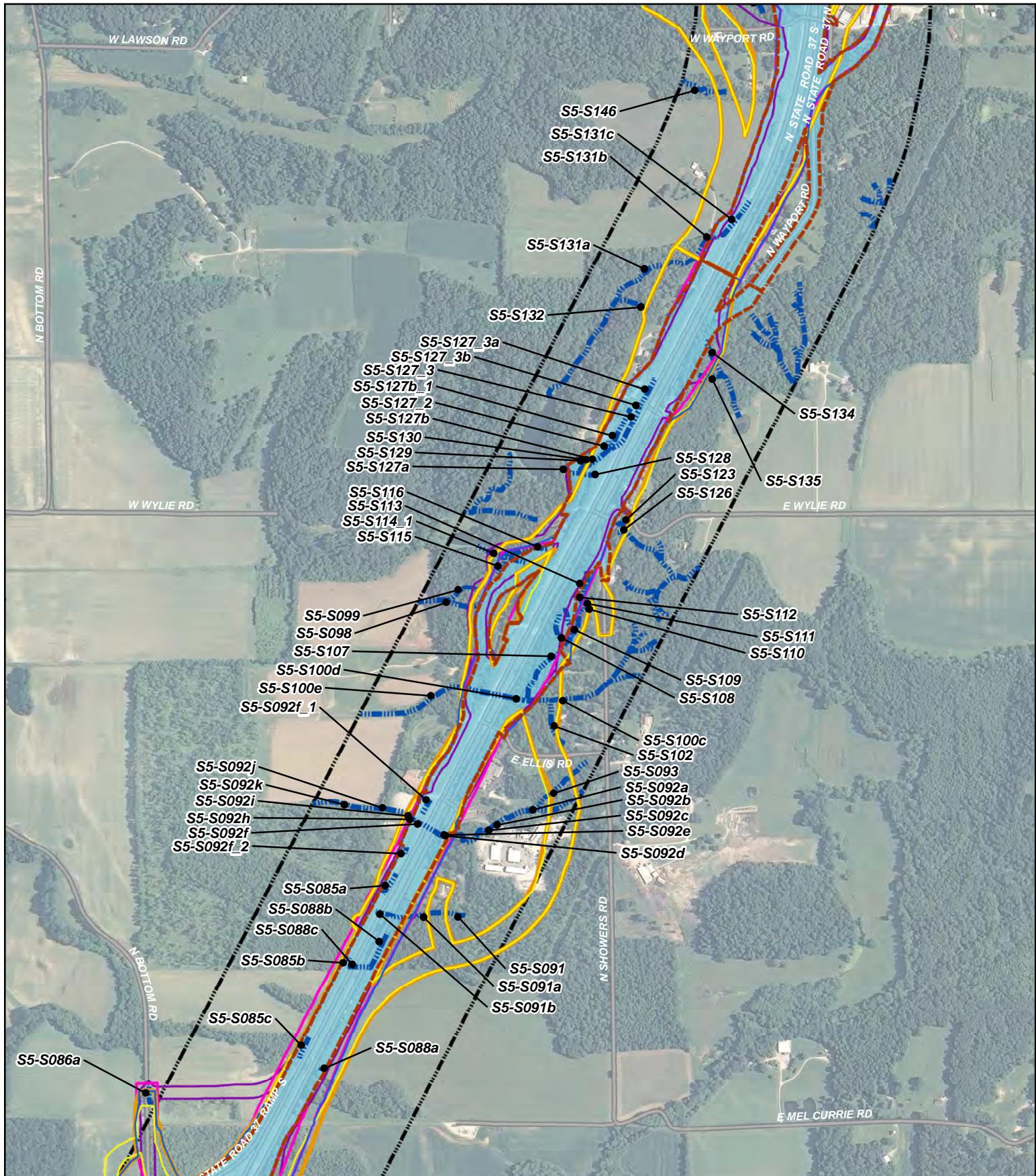
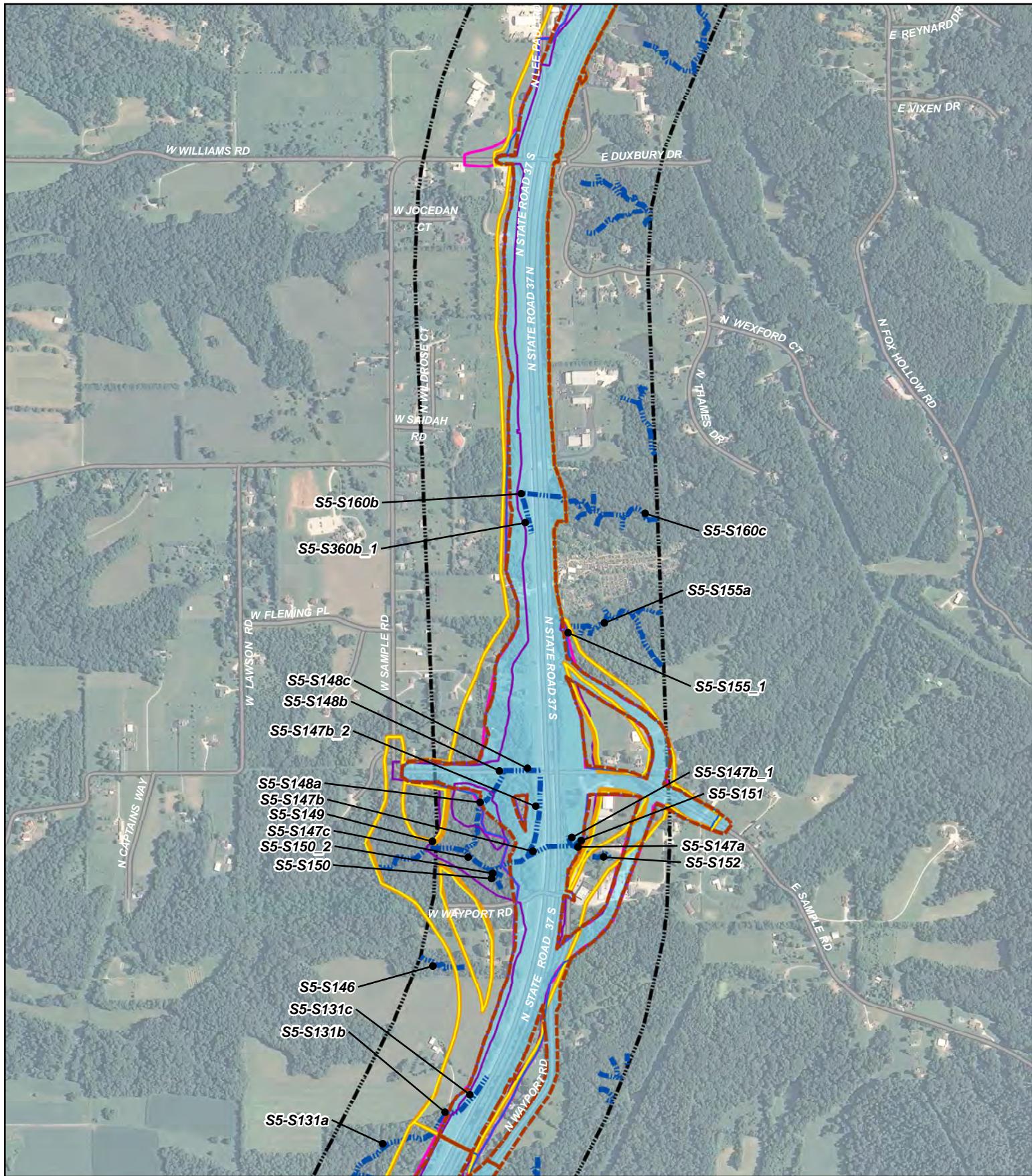


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 7 of 14)

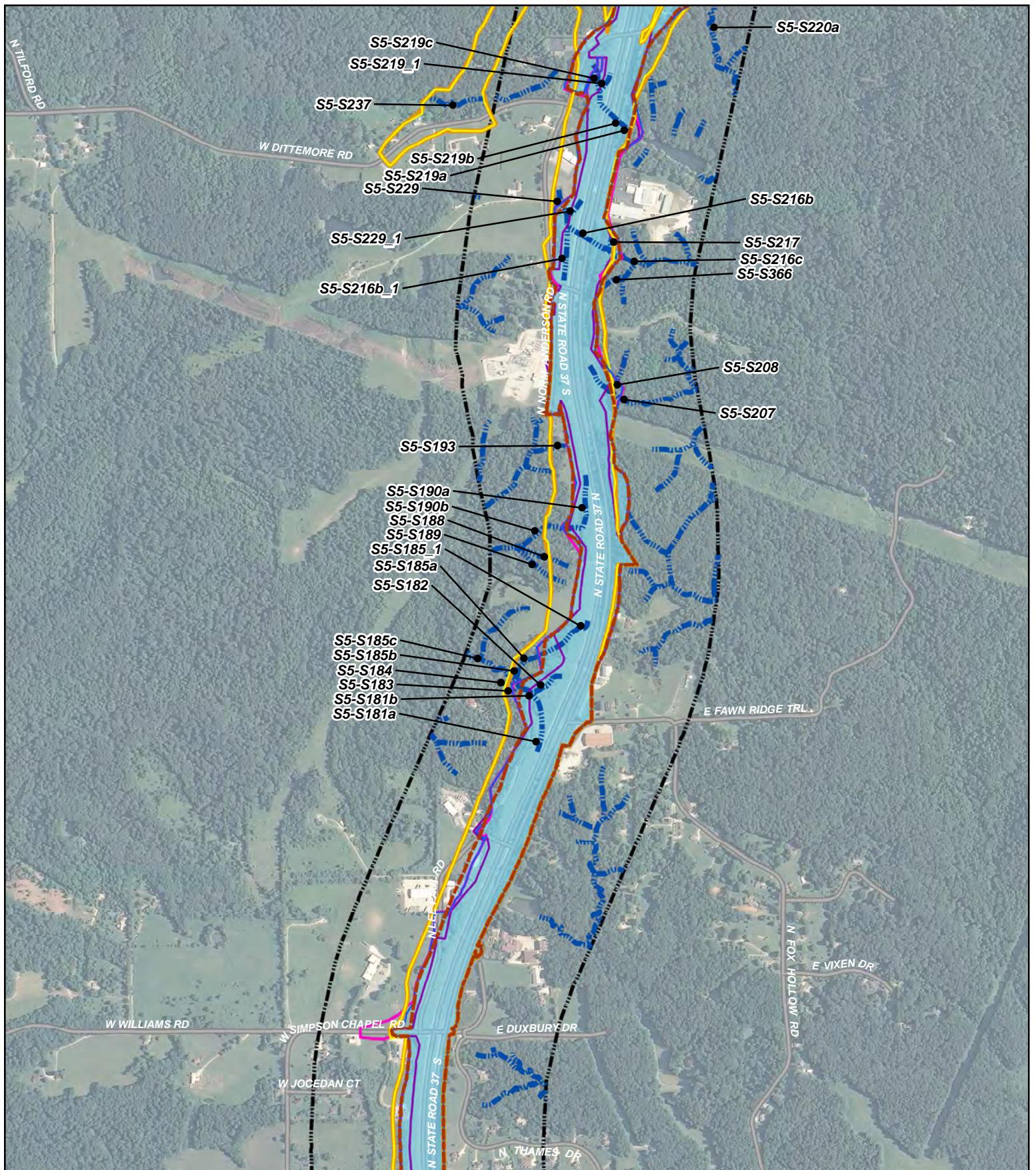


Legend

- [Yellow Box] Alternative 4
- [Orange Box] Alternative 5
- [Pink Box] Alternative 6
- [Purple Box] Alternative 7
- [Blue Box] Alternative 8
- [Red Box] Refined Preferred Alternative 8
- [Black Dashed Line] Section 5 Corridor

FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 8 of 14)





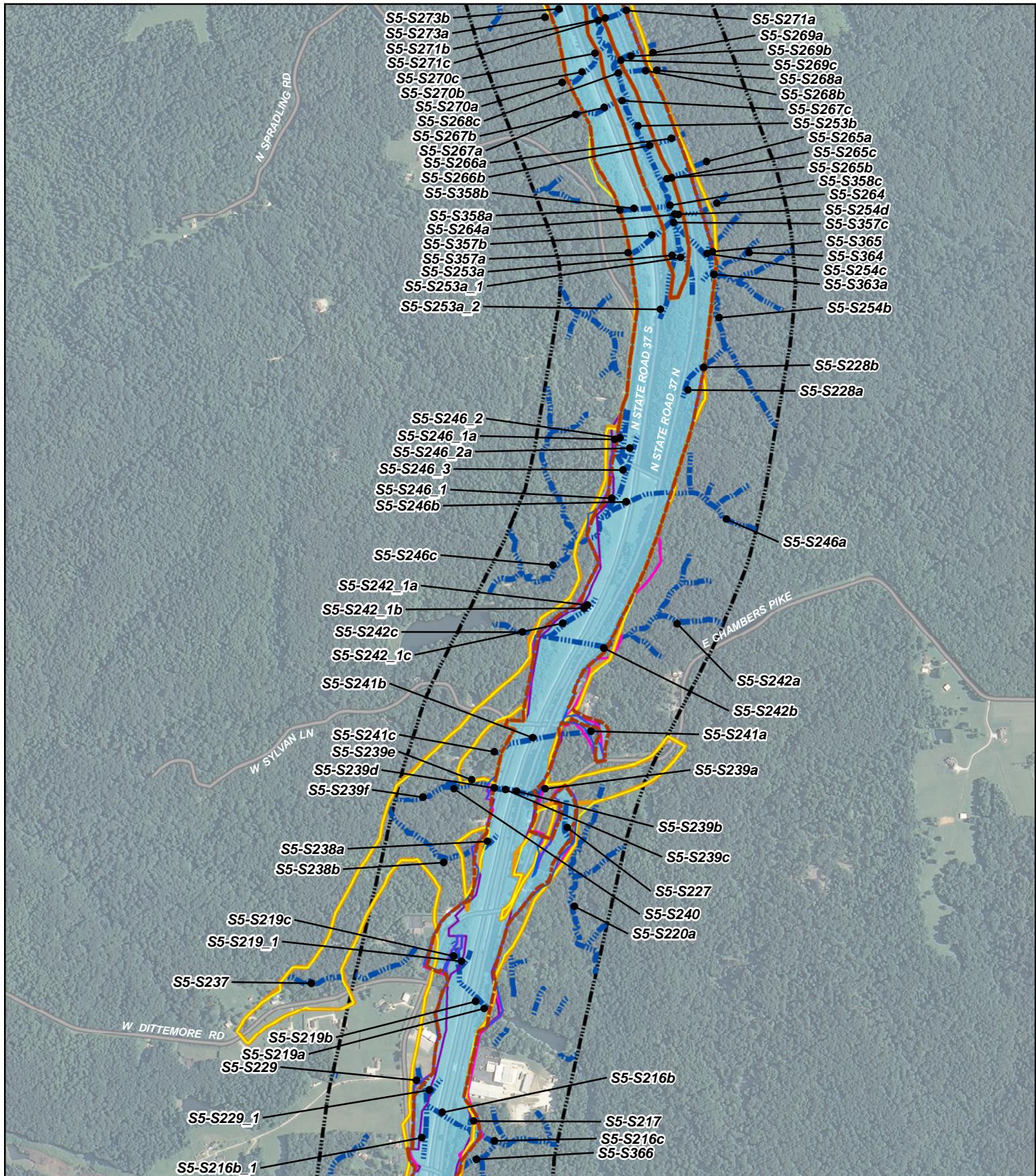
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- Yellow Line: Alternative 4
- Orange Line: Alternative 5
- Pink Line: Alternative 6
- Magenta Line: Alternative 7
- Blue Line: Alternative 8
- Red Line: Refined Preferred Alternative 8
- Black Dashed Line: Section 5 Corridor

0 0.25 mi



FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
(Sheet 9 of 14)

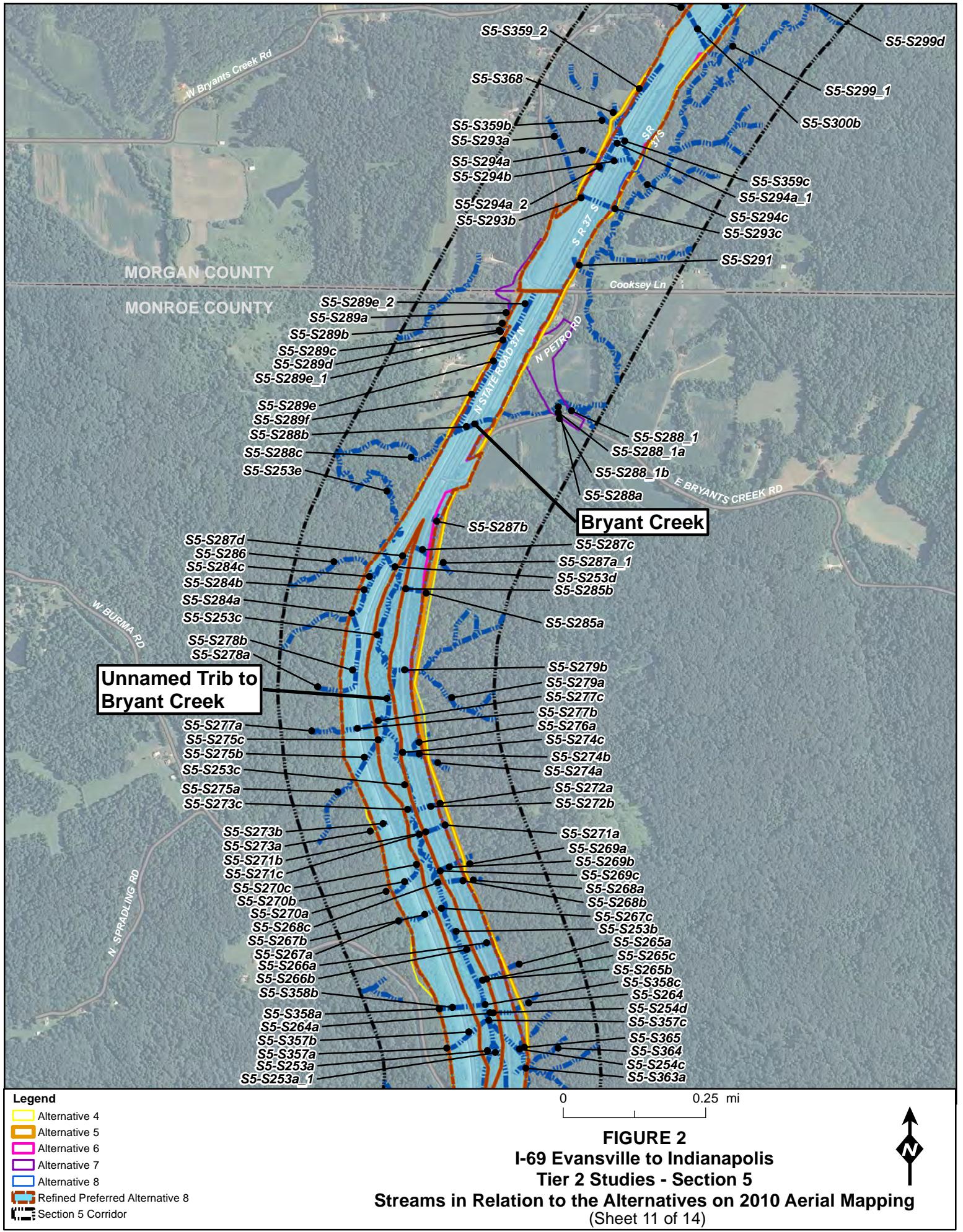


- Legend**
- [Yellow Box] Alternative 4
 - [Orange Box] Alternative 5
 - [Pink Box] Alternative 6
 - [Purple Box] Alternative 7
 - [Blue Box] Alternative 8
 - [Red Box] Refined Preferred Alternative 8
 - [Black Box] Section 5 Corridor

0 0.25 mi



FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 10 of 14)



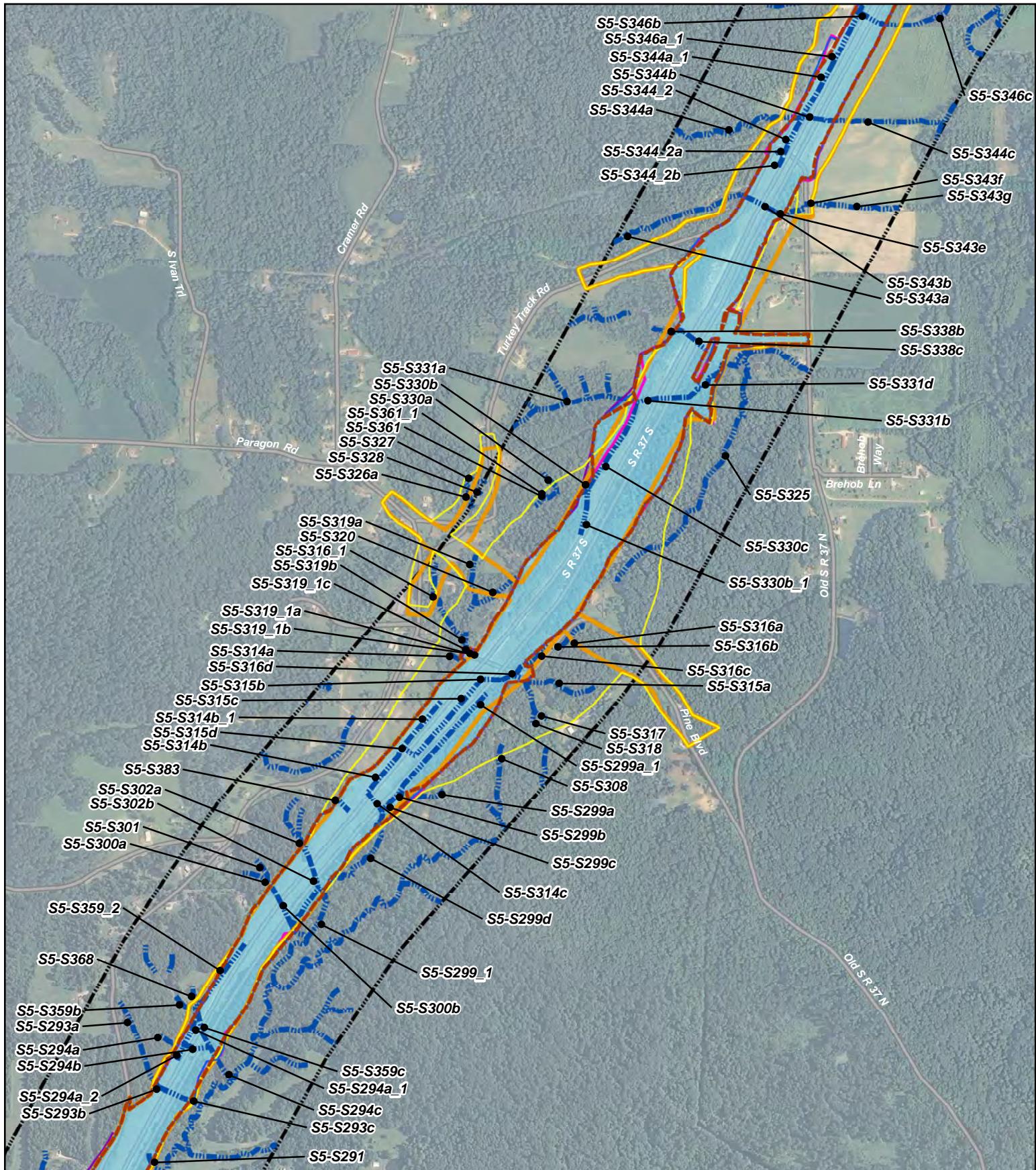


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
(Sheet 12 of 14)

Legend

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- [Orange square] Alternative 5
- [Pink square] Alternative 6
- [Purple square] Alternative 7
- [Blue square] Alternative 8
- [Red square] Refined Preferred Alternative 8
- [Black dashed line] Section 5 Corridor

0 0.25 mi



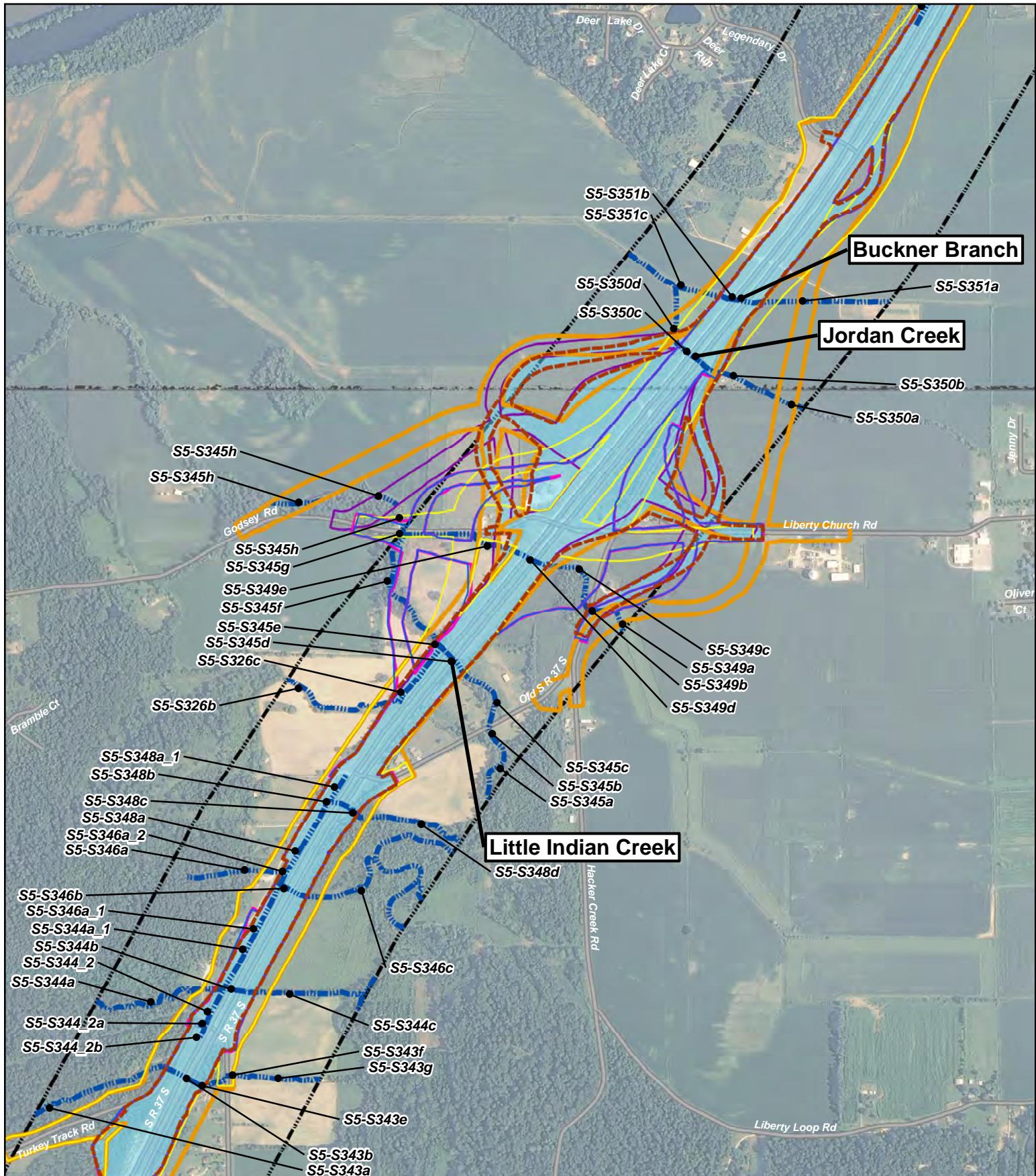


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 13 of 14)



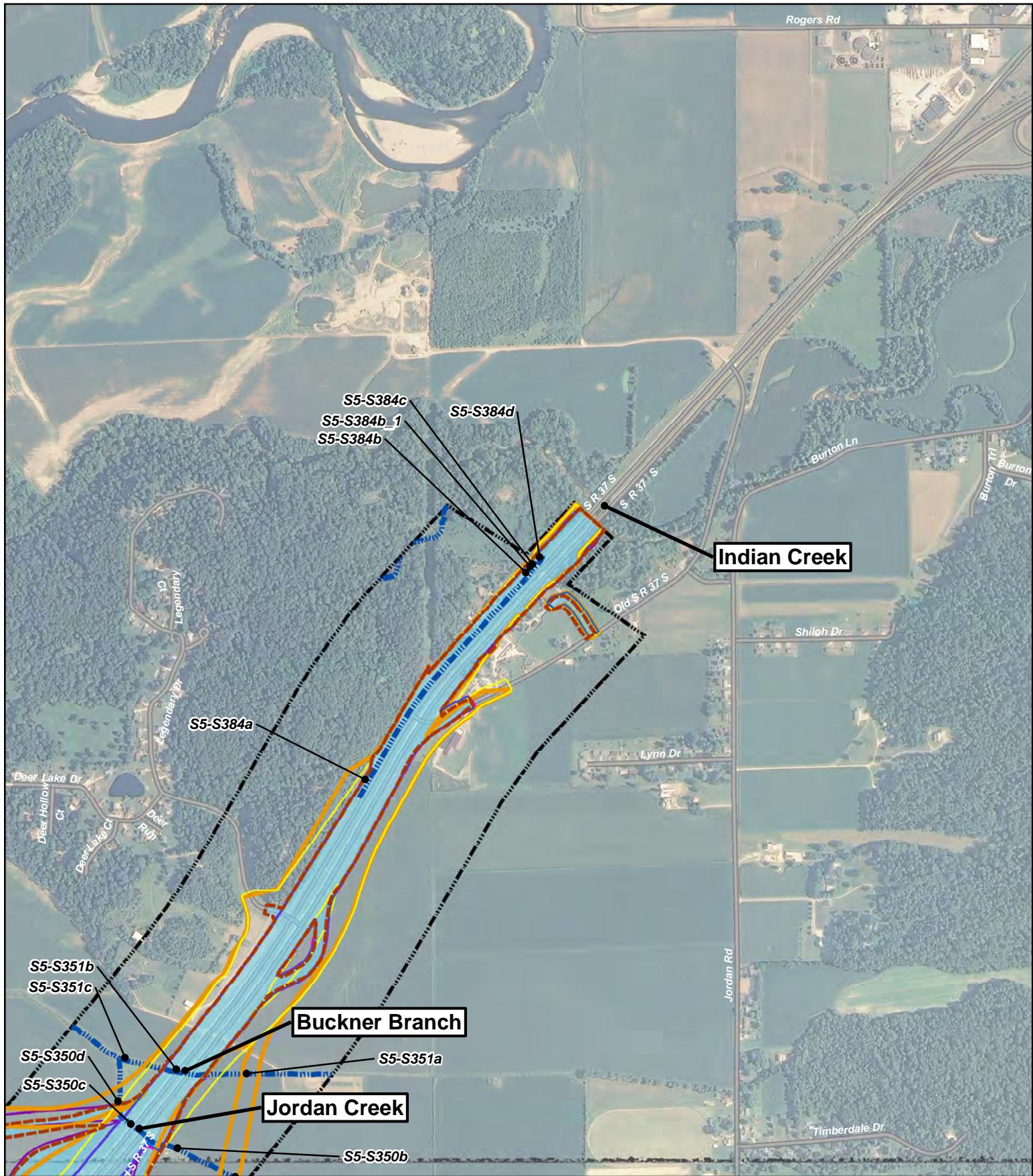


FIGURE 2
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 5
Streams in Relation to the Alternatives on 2010 Aerial Mapping
 (Sheet 14 of 14)



I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES
Section 5—Final Environmental Impact Statement

**APPENDIX M
FINAL STREAM ASSESSMENT REPORT**

TECHNICAL REPORT APPENDICES

-
- | | |
|-------------------|--|
| APPENDIX A | Stream Impacts and
Stream Relocation
Lengths by Alternative |
| APPENDIX B | Stream Site Reports and
Data Sheets |

Appendix A - Table 1 - Stream Impacts and Stream Relocation Lengths by Alternative

Stream ID#	Stream Name	USGS Stream Type	QHEI Score	HHEI Score	Drain Area (mi ²)	Channel Type	Stream Habitat Classification	Waters of the U.S.	Alternative 4			Alternative 5			Alternative 6			Alternative 7			Alternative 8			RPA 8			
									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	
S5-s001_1	Unnamed trib of Clear Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		188	0.01	188	188	0.01	188	188	0.01	188	188	0.01	188	188	0.01	188	188	0.01	188	
S5-s001_2	Unnamed trib of Clear Creek	Ephemeral	-	17	0.01	Roadside Ditch	Modified Class I		144	0.01	144	144	0.01	144	144	0.01	144	144	0.01	144	144	0.01	144	144	0.01	144	
S5-s001b	Unnamed trib of Clear Creek	Ephemeral	-	-	0.04	Culvert		x	58	0.01	0	58	0.01	0	58	0.01	0	58	0.01	0	58	0.01	0	58	0.01	0	0
S5-s001c	Unnamed trib of Clear Creek	Ephemeral	-	33	0.04	Natural	Class I	x	411	0.06	411	408	0.06	408	226	0.03	226	172	0.03	172	223	0.03	223	209	0.03	209	
S5-s001d	Unnamed trib of Clear Creek	Ephemeral	-	17	0.02	Roadside Ditch	Modified Class I	x	312	0.01	312	312	0.01	312	312	0.01	312	312	0.01	312	312	0.01	312	312	0.01	312	
S5-s001d_1	Unnamed trib of Clear Creek	Ephemeral	-	22	0.01	Dump Rock Gutter	Modified Class I		146	0.02	146	146	0.02	146	146	0.02	146	146	0.02	146	146	0.02	146	146	0.02	146	
S5-s001d_2	Unnamed trib of Clear Creek	Ephemeral	-	17	0.02	Roadside Ditch	Modified Class I		70	0.01	70	70	0.01	70	70	0.01	70	70	0.01	70	70	0.01	70	70	0.01	70	
S5-s001e	Unnamed trib of Clear Creek	Intermittent	-	-	0.08	Culvert		x	400	0.02	0	397	0.02	0	402	0.02	0	409	0.02	0	402	0.02	0	401	0.02	0	0
S5-s001f	Unnamed trib of Clear Creek	Intermittent	-	65	0.08	Natural	Class III	x	25	0.01	0	25	0.01	0	25	0.01	0	25	0.01	0	25	0.01	0	25	0.01	0	0
S5-s001g	Unnamed trib of Clear Creek	Intermittent	-	-	0.08	Culvert		x	91	0.01	0	91	0.01	0	91	0.01	0	91	0.01	0	91	0.01	0	91	0.01	0	0
S5-s001h	Unnamed trib of Clear Creek	Intermittent	-	65	0.08	Natural	Class III	x	34	0.01	0	34	0.01	0	34	0.01	0	34	0.01	0	34	0.01	0	34	0.01	0	0
S5-s003	Unnamed trib of Clear Creek	Ephemeral	-	39	0.01	Natural	Class I	x	185	0.01	185	188	0.01	188	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s004	Unnamed trib of Clear Creek	Ephemeral	-	79	0.05	Natural	Class III	x	1,140	0.09	1,140	1,149	0.09	1,149	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s005a	Unnamed trib of Clear Creek	Ephemeral	-	26	0.01	Natural	Class I	x	379	0.03	379	379	0.03	379	143	0.01	0	0	0.00	0	142	0.01	0	142	0.01	0	0
S5-s005b	Unnamed trib of Clear Creek	Ephemeral	-	-	0.01	Culvert		x	45	0.01	0	45	0.01	0	45	0.01	0	6	0.01	0	45	0.01	0	45	0.01	0	0
S5-s005c	Unnamed trib of Clear Creek	Ephemeral	-	26	0.01	Natural	Class I	x	74	0.01	74	83	0.01	83	151	0.01	0	269	0.02	0	149	0.01	0	148	0.01	0	0
S5-s006a	Unnamed trib of Clear Creek	Ephemeral	-	39	0.01	Natural	Class I	x	551	0.06	551	551	0.06	551	282	0.03	282	212	0.02	212	293	0.03	293	285	0.03	285	
S5-s006a_1	Unnamed trib of Clear Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		215	0.01	215	215	0.01	215	215	0.01	215	215	0.01	215	215	0.01	215	215	0.01	215	
S5-s006a_2	Unnamed trib of Clear Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		261	0.01	261	261	0.01	261	261	0.01	261	261	0.01	261	261	0.01	261	261	0.01	261	
S5-s006a_3	Unnamed trib of Clear Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		434	0.01	434	434	0.01	434	434	0.01	434	434	0.01	434	434	0.01	434	434	0.01	434	
S5-s006a_4	Unnamed trib of Clear Creek	Ephemeral	-	-	0.01	Culvert			21	0.01	0	21	0.01	0	21	0.01	0	21	0.01	0	21	0.01	0	21	0.01	0	0
S5-s007	Unnamed trib of Clear Creek	Ephemeral	-	29	0.01	Natural	Class I	x	121	0.01	121	121	0.01	121	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s008	Unnamed trib of Clear Creek	Ephemeral	-	29	0.01	Natural	Class I	x	238	0.01	238	238	0.01	238	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s009	Unnamed trib of Clear Creek	Ephemeral	-	29	0.01	Natural	Class I	x	78	0.01	78	75	0.01	75	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s010_1	Unnamed trib of Clear Creek	Ephemeral	-	32	0.01	Natural	Class I	x	53	0.01	53	53	0.01	53	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s010a	Unnamed trib of Clear Creek	Ephemeral	-	29	0.01	Natural	Class I	x	131	0.01	131	131	0.01	131	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0
S5-s011c	Unnamed trib of Clear Creek	Ephemeral	-	22	0.01	Dump Rock Gutter	Modified Class I		410	0.04	410	410	0.04	410	410	0.04	410	410	0.04	410	410	0.04	410	410	0.04	410	
S5-s012	Unnamed trib of Clear Creek	Intermittent	-	70	0.24	Natural	Class III	x	0	0.00	0	58	0.01	0	0	0.00	0	0	0.00	0	0.00	0	0.00	0	0.00	0	
S5-s012a_1	Unnamed trib of Clear Creek	Ephemeral	-	22	0.24	Dump Rock Gutter	Modified Class I	x	0	0.00	0	36	0.01	36	0	0.00	0	36	0.01	36	36	0.01	36	36	0.01	36	
S5-s012a	Unnamed trib of Clear Creek	Ephemeral	-	81	0.24	Natural	Class III	x	99	0.04	0	152	0.06	0	7	0.01	0	103	0.04	0	105	0.04	0	114	0.05	0	0
S5-s012b	Unnamed trib of Clear Creek	Ephemeral	-	-	0.24	Culvert		x	304	0.03	0	304	0.														

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Stream ID#	Stream Name	USGS Stream Type	QHEI Score	HHEI Score	Drain Area (mi ²)	Channel Type	Stream Habitat Classification	Waters of the U.S.	Alternative 4			Alternative 5			Alternative 6			Alternative 7			Alternative 8			RPA 8			
									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	
S5-s026b	Unnamed trib of Clear Creek	Ephemeral	-	52	0.33	Roadside Ditch	Modified Class II	x	17	0.01	0	30	0.01	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s027a	Unnamed trib of Stout Creek	Ephemeral	-	30	0.05	Natural	Class I	x	333	0.02	333	333	0.02	333	0	0.00	0	125	0.01	125	116	0.01	116	236	0.01	236	
S5-s027b	Unnamed trib of Stout Creek	Ephemeral	-	-	0.05	Culvert		x	72	0.01	0	72	0.01	0	10	0.01	0	72	0.01	0	72	0.01	0	72	0.01	0	
S5-s029a	Unnamed trib of Stout Creek	Ephemeral	-	29	0.08	Roadside Ditch	Modified Class I		258	0.02	258	258	0.02	258	242	0.02	242	258	0.02	258	258	0.02	258	0.02	258		
S5-s029b	Unnamed trib of Stout Creek	Ephemeral	-	-	0.08	Culvert			16	0.01	0	16	0.01	0	0	0.00	0	16	0.01	0	16	0.01	0	16	0.01	0	
S5-s029c	Unnamed trib of Stout Creek	Ephemeral	-	29	0.08	Roadside Ditch	Modified Class I		107	0.01	107	107	0.01	107	33	0.01	33	107	0.01	107	107	0.01	107	99	0.01	99	
S5-s030a	Unnamed trib of Clear Creek	Ephemeral	-	16	0.03	Natural	Modified Class I	x	19	0.01	19	16	0.01	16	13	0.01	0	81	0.01	81	64	0.01	64	16	0.01	16	
S5-s030b	Unnamed trib of Clear Creek	Ephemeral	-	-	0.03	Culvert		x	269	0.02	0	269	0.02	0	269	0.02	0	269	0.02	0	269	0.02	0	269	0.02	0	
S5-s030c	Unnamed trib of Clear Creek	Ephemeral	-	38	0.03	Natural	Class I	x	265	0.05	230	303	0.06	267	100	0.02	64	100	0.02	64	100	0.02	64	100	0.02	64	
S5-s032_1b	Unnamed trib of Stout Creek	Intermittent	-	55	0.41	Natural	Class II	x	146	0.01	0	146	0.01	0	49	0.01	49	113	0.01	0	111	0.01	0	133	0.01	0	
S5-s032_1c	Unnamed trib of Stout Creek	Intermittent	-	-	0.41	Culvert		x	93	0.01	0	93	0.01	0	92	0.01	0	93	0.01	0	93	0.01	0	93	0.01	0	
S5-s032_1d	Unnamed trib of Stout Creek	Intermittent	-	48	0.41	Natural	Class II	x	143	0.01	0	142	0.01	0	43	0.01	0	115	0.01	0	122	0.01	0	133	0.01	0	
S5-s035a	Unnamed trib of Stout Creek	Ephemeral	-	-	0.12	Culvert		x	201	0.02	0	199	0.02	0	199	0.02	0	199	0.02	0	199	0.02	0	199	0.02	0	
S5-s035b	Unnamed trib of Stout Creek	Ephemeral	-	-	0.12	Culvert		x	337	0.04	0	337	0.04	0	337	0.04	0	337	0.04	0	337	0.04	0	337	0.04	0	
S5-s035c	Unnamed trib of Stout Creek	Ephemeral	-	46	0.12	Roadside Ditch	Modified Class II	x	152	0.02	0	152	0.02	0	152	0.02	0	152	0.02	0	152	0.02	0	152	0.02	0	
S5-s035d	Unnamed trib of Stout Creek	Ephemeral	-	-	0.12	Culvert		x	574	0.12	0	574	0.12	0	574	0.12	0	574	0.12	0	574	0.12	0	574	0.12	0	
S5-s035e	Unnamed trib of Stout Creek	Ephemeral	-	27	0.06	Dump Rock Gutter	Modified Class I	x	6	0.01	0	8	0.01	0	8	0.01	0	8	0.01	0	8	0.01	0	8	0.01	0	
S5-s036_1	Unnamed trib of Stout Creek	Ephemeral	-	13	0.01	Dump Rock Gutter	Modified Class I		0	0.00	0	36	0.01	36	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	
S5-s037a	Unnamed trib of Stout Creek	Ephemeral	-	17	0.02	Natural	Class I	x	59	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	
S5-s037b	Unnamed trib of Stout Creek	Ephemeral	-	-	0.02	Culvert		x	358	0.02	0	358	0.02	0	358	0.02	0	358	0.02	0	358	0.02	0	358	0.02	0	
S5-s037c	Unnamed trib of Stout Creek	Ephemeral	-	17	0.02	Natural	Class I	x	41	0.01	0	41	0.01	0	41	0.01	0	41	0.01	0	41	0.01	0	41	0.01	0	
S5-s042	Unnamed trib of Stout Creek	Ephemeral	-	17	0.02	Natural	Class I	x	77	0.01	77	79	0.01	79	79	0.01	79	79	0.01	79	79	0.01	79	79	0.01	79	
S5-s043a	Unnamed trib of Stout Creek	Ephemeral	-	-	0.27	Culvert		x	296	0.02	0	296	0.02	0	296	0.02	0	296	0.02	0	296	0.02	0	296	0.02	0	
S5-s043b	Unnamed trib of Stout Creek	Ephemeral	-	51	0.27	Natural	Class II	x	318	0.02	258	322	0.02	260	279	0.02	260	279	0.02	260	279	0.02	260	279	0.02	260	
S5-s043b_1	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		429	0.01	429	429	0.01	429	429	0.01	429	429	0.01	429	429	0.01	429	429	0.01	429	
S5-s043b_1a	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Dump Rock Gutter	Modified Class I	x	109	0.01	109	109	0.01	109	109	0.01	109	109	0.01	109	109	0.01	109	109	0.01	109	
S5-s043b_1b	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I	x	109	0.01	109	109	0.01	109	109	0.01	109	109	0.01	109	109	0.01	109	109	0.01	109	
S5-s043b_2	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Dump Rock Gutter	Modified Class I		114	0.01	114	114	0.01	114	114	0.01	114	114	0.01	114	114	0.01	114	114	0.01	114	
S5-s043b_3	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		334	0.01	334	334	0.01	334	334	0.01	334	334	0.01	334	334	0.01	334	334	0.01	334	
S5-s043c_1a	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		151	0.01	151	151	0.01	151	151	0.01	151	151	0.01	151	151	0.01	151	151	0.01	151	
S5-s043c_1b	Unnamed trib of Stout Creek	Ephemeral	-	12	0.01	Dump Rock Gutter	Modified Class I		62	0.01	62	62	0.01	62	62	0.01	62	62	0.01	62	62						

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Stream ID#	Stream Name	USGS Stream Type	QHEI Score	HHEI Score	Drain Area (mi ²)	Channel Type	Stream Habitat Classification	Waters of the U.S.	Alternative 4			Alternative 5			Alternative 6			Alternative 7			Alternative 8			RPA 8					
									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.			
S5-s070_1b	Unnamed trib of Griffy Creek	Ephemeral	-	14	0.01	Natural	Modified Class I	x	52	0.01	52	52	0.01	52	52	0.01	52	52	0.01	52	52	0.01	52	52	0.01	52			
S5-s071a	Unnamed trib of Griffy Creek	Ephemeral	-	50	0.06	Natural	Class II	x	82	0.02	0	32	0.01	0	31	0.01	0	31	0.01	0	31	0.01	0	31	0.01	0	31	0.01	0
S5-s071a_1	Unnamed trib of Griffy Creek	Ephemeral	-	24	0.06	Natural	Modified Class I	x	0	0.00	0	18	0.01	18	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0	0	0
S5-s071b	Unnamed trib of Griffy Creek	Ephemeral	-	-	0.06	Culvert		x	535	0.10	0	535	0.10	0	535	0.10	0	535	0.10	0	535	0.10	0	535	0.1	0	535	0.1	0
S5-s071c	Unnamed trib of Griffy Creek	Ephemeral	-	17	0.05	Natural	Modified Class I	x	18	0.01	0	4	0.01	0	4	0.01	0	60	0.01	0	4	0.01	0	4	0.01	0	4	0.01	0
S5-s073	Unnamed trib of Griffy Creek	Ephemeral	-	28	0.01	Natural	Class I	x	0	0.00	0	212	0.01	212	163	0.01	163	166	0.01	166	163	0.01	163	147	0.01	147	0.01	0	
S5-s074a	Unnamed trib of Griffy Creek	Ephemeral	-	28	0.01	Natural	Class I	x	0	0.00	0	71	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	45	0.01	0	45	0.01	0
S5-s074b	Unnamed trib of Griffy Creek	Ephemeral	-	-	0.01	Culvert		x	0	0.00	0	29	0.01	0	29	0.01	0	29	0.01	0	29	0.01	0	29	0.01	0	29	0.01	0
S5-s074c	Unnamed trib of Griffy Creek	Ephemeral	-	28	0.01	Natural	Class I	x	0	0.00	0	125	0.01	0	114	0.01	0	114	0.01	0	114	0.01	0	65	0.01	0	65	0.01	0
S5-s076	Unnamed trib of Griffy Creek	Ephemeral	-	27	0.01	Natural	Class I	x	44	0.01	44	275	0.02	275	0	0.00	0	27	0.01	27	23	0.01	23	0	0	0	0	0	0
S5-s077	Unnamed trib of Griffy Creek	Ephemeral	-	40	0.01	Natural	Class II	x	221	0.01	221	221	0.01	221	168	0.01	168	192	0.01	192	212	0.01	212	98	0.01	98	0.01	0	
S5-s078a	Unnamed trib of Griffy Creek	Ephemeral	-	33	0.04	Natural	Class I	x	65	0.01	0	64	0.01	0	44	0.01	0	65	0.01	0	55	0.01	0	34	0.01	0	34	0.01	0
S5-s078b	Unnamed trib of Griffy Creek	Ephemeral	-	-	0.05	Culvert		x	61	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0	61	0.01	0
S5-s078c	Unnamed trib of Griffy Creek	Ephemeral	-	33	0.04	Natural	Class I	x	72	0.01	0	60	0.01	0	74	0.01	0	22	0.01	0	23	0.01	0	25	0.01	0	25	0.01	0
S5-s080	Unnamed trib of Griffy Creek	Ephemeral	-	43	0.01	Roadside Ditch	Modified Class II		274	0.01	274	274	0.01	274	274	0.01	274	274	0.01	274	274	0.01	274	274	0.01	274	274	0.01	
S5-s081a	Beanblossom Creek	Perennial	51.5	-	42.73	Natural	Warm Water Habitat	x	0	0.00	0	443	0.65	0	370	0.54	0	123	0.18	0	386	0.57	0	0	0	0	0	0	0
S5-s081b	Beanblossom Creek	Perennial	51.5	-	42.73	Bridge	Warm Water Habitat	x	13	0.01	0	32	0.04	0	32	0.04	0	15	0.02	0	32	0.04	0	15	0.02	0	15	0.02	0
S5-s081c	Beanblossom Creek	Perennial	34.75	-	42.73	Natural	Modified Warm Water Habitat	x	575	0.69	0	575	0.69	0	575	0.69	0	575	0.69	0	575	0.69	0	575	0.69	0	575	0.69	0
S5-s081d	Beanblossom Creek	Perennial	34.75	-	42.73	Bridge	Modified Warm Water Habitat	x	207	0.25	0	207	0.25	0	207	0.25	0	207	0.25	0	207	0.25	0	207	0.25	0	207	0.25	0
S5-s081e	Beanblossom Creek	Perennial	34.75	-	42.73	Natural	Modified Warm Water Habitat	x	539	0.64	0	559	0.67	0	444	0.53	44	437	0.52	0	569	0.68	0	453	0.54	0	453	0.54	0
S5-s081f	Beanblossom Creek	Perennial	48	-	42.73	Natural	Warm Water Habitat	x	59	0.06	0	67	0.07	0	162	0.17	0	128	0.13	0	67	0.07	0	67	0.07	0	67	0.07	0
S5-s081g	Beanblossom Creek	Perennial	48	-	42.73	Bridge	Warm Water Habitat	x	0	0.00	0	0	0.00	0	33	0.03	0	33	0.03	0	0	0.00	0	0	0	0	0	0	0
S5-s081h	Beanblossom Creek	Perennial	48	-	42.73	Natural	Warm Water Habitat	x	0	0.00	0	0	0.00	0	13	0.01	0	45	0.05	0	0	0.00	0	0	0	0	0	0	0
S5-s082_1	Unnamed trib of Beanblossom Creek	Ephemeral	-	46	0.02	Roadside Ditch	Modified Class II		1,400	0.13	1400	1,404	0.13	1404	1,404	0.13	1404	1,399	0.13	1399	1,404	0.13	1404	1399	0.13	1399	0.13	0	
S5-s082a	Unnamed trib of Beanblossom Creek	Ephemeral	-	-	0.04	Culvert		x	0	0.00	0	139	0.01	0	139	0.01	0	0	0.00	0	139	0.01	0	0	0	0	0	0	0
S5-s082b	Unnamed trib of Beanblossom Creek	Ephemeral	-	43	0.04	Roadside Ditch	Modified Class II	x	0	0.00	0	671	0.03	671	493	0.02	493	232	0.01	0	482	0.02	482	0	0	0	0	0	0
S5-s082c	Unnamed trib of Beanblossom Creek	Ephemeral	-	-	0.04	Culvert		x	0	0.00	0	71	0.01	0	36	0.01	0	0	0.00	0	0	0.00	0	0	0	0	0	0	0
S5-s082d	Unnamed trib of Beanblossom Creek	Ephemeral	-	43	0.04	Roadside Ditch	Modified Class II	x	0	0.00	0	156	0.01	156	156	0.01	156	0	0.00	0	136	0.01	136	0	0	0	0	0	0
S5-s083a	Unnamed trib of Beanblossom Creek	Ephemeral	-	30	0.02	Natural	Class I	x	262	0.04	262	262	0.04	262	262	0.04	262												

Appendix A - Table 1 - Stream Impacts and Stream Relocation Lengths by Alternative

Stream ID#	Stream Name	USGS Stream Type	QHEI Score	HHEI Score	Drain Area (mi ²)	Channel Type	Stream Habitat Classification	Waters of the U.S.	Alternative 4			Alternative 5			Alternative 6			Alternative 7			Alternative 8			RPA 8			
									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	
S5-s111	Unnamed trib of Beanblossom Creek	Ephemeral	-	29	0.01	Natural	Class I	x	103	0.01	103	103	0.01	103	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s112	Unnamed trib of Beanblossom Creek	Ephemeral	-	29	0.01	Natural	Class I	x	94	0.01	94	94	0.01	94	88	0.01	88	0	0.00	0	81	0.01	81	26	0.01	26	
S5-s113	Unnamed trib of Beanblossom Creek	Ephemeral	-	29	0.01	Natural	Class I	x	51	0.01	51	51	0.01	51	51	0.01	51	0	0.00	0	51	0.01	51	20	0.01	20	
S5-s114_1	Unnamed trib of Beanblossom Creek	Ephemeral	-	39	0.01	Natural	Class I	x	267	0.01	267	277	0.01	277	222	0.01	222	330	0.01	330	211	0.01	211	101	0.01	101	
S5-s115	Unnamed trib of Beanblossom Creek	Ephemeral	-	39	0.01	Natural	Class I	x	177	0.01	177	177	0.01	177	177	0.01	177	177	0.01	177	177	0.01	177	0	0	0	
S5-s116	Unnamed trib of Beanblossom Creek	Ephemeral	-	39	0.01	Natural	Class I	x	387	0.02	387	387	0.02	387	387	0.02	387	387	0.02	387	387	0.02	387	83	0.01	83	
S5-s123	Unnamed trib of Beanblossom Creek	Ephemeral	-	28	0.01	Natural	Class I	x	131	0.01	131	121	0.01	121	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s126	Unnamed trib of Beanblossom Creek	Ephemeral	-	28	0.01	Natural	Class I	x	86	0.01	86	77	0.01	77	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s127_2	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		87	0.01	87	87	0.01	87	87	0.01	87	87	0.01	87	87	0.01	87	87	0.01	87	
S5-s127_3	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.02	Concrete Gutter	Modified Class I		486	0.02	486	486	0.02	486	486	0.02	486	486	0.02	486	486	0.02	486	486	0.02	486	
S5-s127_3a	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.02	Concrete Gutter	Modified Class I		226	0.01	226	226	0.01	226	226	0.01	226	226	0.01	226	226	0.01	226	226	0.01	226	
S5-s127_3b	Unnamed trib of Beanblossom Creek	Ephemeral	-	0.02	Culvert				57	0.01	0	57	0.01	0	57	0.01	0	57	0.01	0	57	0.01	0	57	0.01	0	
S5-s127a	Unnamed trib of Beanblossom Creek	Ephemeral	-	51	0.02	Natural	Class II	x	0	0.00	0	0	0.00	0	173	0.01	173	186	0.01	186	173	0.01	173	173	0.01	173	
S5-s127b	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.02	Concrete Gutter	Modified Class I	x	226	0.01	226	226	0.01	226	239	0.01	239	239	0.01	239	239	0.01	239	239	0.01	239	
S5-s127b_1	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.02	Concrete Gutter	Modified Class I		415	0.01	415	415	0.01	415	415	0.01	415	415	0.01	415	415	0.01	415	415	0.01	415	
S5-s128	Unnamed trib of Beanblossom Creek	Ephemeral	-	40	0.01	Natural	Class II	x	92	0.01	92	92	0.01	92	141	0.01	141	141	0.01	141	141	0.01	141	141	0.01	141	
S5-s129	Unnamed trib of Beanblossom Creek	Ephemeral	-	39	0.01	Natural	Class I	x	0	0.00	0	0	0.00	0	124	0.01	124	124	0.01	124	124	0.01	124	124	0.01	124	
S5-s130	Unnamed trib of Beanblossom Creek	Ephemeral	-	40	0.01	Natural	Class II	x	59	0.01	59	58	0.01	58	108	0.01	108	108	0.01	108	108	0.01	108	108	0.01	108	
S5-s131a	Unnamed trib of Beanblossom Creek	Ephemeral	-	41	0.03	Natural	Class II	x	478	0.04	478	467	0.04	467	3	0.01	3	0	0.00	0	0	0.00	0	0	0	0	0
S5-s131b	Unnamed trib of Beanblossom Creek	Ephemeral	-	0.03	Culvert				76	0.01	0	76	0.01	0	76	0.01	0	65	0.01	0	65	0.01	0	65	0.01	0	
S5-s131c	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.03	Concrete Gutter	Modified Class I		414	0.01	414	414	0.01	414	414	0.01	414	414	0.01	414	414	0.01	414	414	0.01	414	
S5-s132	Unnamed trib of Beanblossom Creek	Ephemeral	-	52	0.01	Natural	Class II	x	30	0.01	30	24	0.01	24	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s134	Unnamed trib of Beanblossom Creek	Ephemeral	-	38	0.01	Natural	Class I	x	223	0.02	223	222	0.02	222	190	0.01	190	217	0.01	217	217	0.01	217	59	0.01	59	
S5-s135	Unnamed trib of Beanblossom Creek	Ephemeral	-	35	0.01	Natural	Class I	x	83	0.01	83	82	0.01	82	39	0.01	39	88	0.01	88	81	0.01	81	0	0	0	
S5-s146	Unnamed trib of Beanblossom Creek	Ephemeral	-	28	0.01	Natural	Class I	x	87	0.01	87	90	0.01	90	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s147a	Unnamed trib of Beanblossom Creek	Intermittent	-	51	0.17	Natural	Class II	x	159	0.01	159	137	0.01	137	76	0.01	0	121	0.01	121	75	0.01	0	76	0.01	0	
S5-s147b	Unnamed trib of Beanblossom Creek	Intermittent	-	-	0.17	Culvert			424	0.04	0	424	0.04	0	424	0.04	0	424	0.04	0	424	0.04	0	424	0.04	0	
S5-s147b_1	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		95	0.01	95	95	0.01	95	95	0.01	95	95	0.01	95	95	0.01	95	95	0.01	95	
S5-s147b_2	Unnamed trib of Beanblossom Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		708	0.02	708	708	0.02	708	708	0.02	708	708	0.02	708	708	0.02	708	708	0.02	708	
S5-s147c	Unnamed trib of Beanblossom Creek	Intermittent	-	66	0.17	Natural	Class III	x	1,482	0.34	1,482	1,454	0.33	1,454	218	0.05	0	951	0.22	951	217	0.05	0	144	0.03	0	
S5-s148a	Unnamed trib of Beanblossom Creek	Ephemeral	-	63</																							

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Stream ID#	Stream Name	USGS Stream Type	QHEI Score	HHEI Score	Drain Area (mi ²)	Channel Type	Stream Habitat Classification	Waters of the U.S.	Alternative 4			Alternative 5			Alternative 6			Alternative 7			Alternative 8			RPA 8					
									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.			
S5-s271a	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.01	Natural	Class I	x	92	0.01	0	92	0.01	0	73	0.01	0	73	0.01	0	73	0.01	0	73	0.01	0			
S5-s271b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.01	Culvert		x	106	0.01	0	106	0.01	0	106	0.01	0	106	0.01	0	106	0.01	0	106	0.01	0			
S5-s271c	Unnamed trib of Bryant Creek	Ephemeral	-	14	0.01	Natural	Modified Class I	x	75	0.01	0	75	0.01	0	75	0.01	0	75	0.01	0	75	0.01	0	75	0.01	0			
S5-s272a	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.01	Natural	Class I	x	88	0.01	0	88	0.01	0	82	0.01	0	82	0.01	0	82	0.01	0	82	0.01	0			
S5-s272b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.01	Culvert		x	129	0.01	0	129	0.01	0	129	0.01	0	129	0.01	0	129	0.01	0	129	0.01	0			
S5-s273a	Unnamed trib of Bryant Creek	Ephemeral	-	50	0.01	Natural	Class II	x	11	0.01	11	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0.00	0	0	0	0	0	
S5-s273b	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		130	0.01	130	130	0.01	130	130	0.01	130	130	0.01	130	130	0.01	130	130	0.01	130	0.01	130	
S5-s273c	Unnamed trib of Bryant Creek	Ephemeral	-	19	0.01	Natural	Modified Class I	x	52	0.01	52	52	0.01	52	52	0.01	52	52	0.01	52	52	0.01	52	52	0.01	52	0.01	52	
S5-s274a	Unnamed trib of Bryant Creek	Ephemeral	-	28	0.02	Natural	Class I	x	114	0.01	0	116	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0
S5-s274b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.02	Culvert		x	139	0.01	0	139	0.01	0	139	0.01	0	139	0.01	0	139	0.01	0	139	0.01	0	139	0.01	0
S5-s274c	Unnamed trib of Bryant Creek	Ephemeral	-	23	0.02	Natural	Class I	x	52	0.01	0	52	0.01	0	52	0.01	0	52	0.01	0	52	0.01	0	52	0.01	0	52	0.01	0
S5-s275a	Unnamed trib of Bryant Creek	Ephemeral	-	40	0.07	Natural	Class II	x	52	0.01	0	50	0.01	0	50	0.01	0	50	0.01	0	50	0.01	0	50	0.01	0	50	0.01	0
S5-s275b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.07	Culvert		x	344	0.02	0	344	0.02	0	344	0.02	0	344	0.02	0	344	0.02	0	344	0.02	0	344	0.02	0
S5-s275c	Unnamed trib of Bryant Creek	Ephemeral	-	43	0.07	Natural	Class II	x	179	0.02	0	179	0.02	0	179	0.02	0	179	0.02	0	179	0.02	0	179	0.02	0	179	0.02	0
S5-s276a	Unnamed trib of Bryant Creek	Ephemeral	-	21	0.01	Natural	Class I	x	247	0.01	247	212	0.01	212	172	0.01	172	172	0.01	172	172	0.01	172	172	0.01	172	0.01	172	
S5-s277a	Unnamed trib of Bryant Creek	Ephemeral	-	51	0.04	Natural	Class II	x	75	0.01	0	73	0.01	0	73	0.01	0	73	0.01	0	73	0.01	0	73	0.01	0	73	0.01	0
S5-s277b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.04	Culvert		x	196	0.02	0	196	0.02	0	196	0.02	0	196	0.02	0	196	0.02	0	196	0.02	0	196	0.02	0
S5-s277c	Unnamed trib of Bryant Creek	Ephemeral	-	33	0.04	Natural	Class I	x	188	0.02	0	188	0.02	0	188	0.02	0	188	0.02	0	188	0.02	0	188	0.02	0	188	0.02	0
S5-s278a	Unnamed trib of Bryant Creek	Ephemeral	-	40	0.01	Natural	Class II	x	103	0.01	103	101	0.01	101	101	0.01	101	101	0.01	101	101	0.01	101	101	0.01	101	0.01	101	
S5-s278b	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I	x	706	0.03	706	706	0.03	706	706	0.03	706	706	0.03	706	706	0.03	706	706	0.03	706	706	0.03	
S5-s279a	Unnamed trib of Bryant Creek	Ephemeral	-	72	0.10	Natural	Class III	x	81	0.01	0	83	0.01	0	23	0.01	0	28	0.01	0	30	0.01	0	33	0.01	0	33	0.01	0
S5-s279b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.10	Culvert		x	136	0.01	0	136	0.01	0	136	0.01	0	136	0.01	0	136	0.01	0	136	0.01	0	136	0.01	0
S5-s284a	Unnamed trib of Bryant Creek	Ephemeral	-	21	0.04	Natural	Modified Class I	x	321	0.01	321	319	0.01	319	319	0.01	319	319	0.01	319	319	0.01	319	319	0.01	319	319	0.01	
S5-s284b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.04	Culvert		x	74	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0	74	0.01	0
S5-s284c	Unnamed trib of Bryant Creek	Ephemeral	-	30	0.04	Natural	Class I	x	80	0.01	80	80	0.01	80	80	0.01	80	80	0.01	80	80	0.01	80	80	0.01	80	80	0.01	
S5-s285a	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.01	Natural	Modified Class I	x	178	0.01	0	135	0.01	0	88	0.01	0	90	0.01	0	90	0.01	0	90	0.01	0	90	0.01	0
S5-s285b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.01	Culvert		x	166	0.01	0	166	0.01	0	166	0.01	0	166	0.01	0	166	0.01	0	166	0.01	0	166	0.01	0
S5-s286	Unnamed trib of Bryant Creek	Ephemeral	-	58	0.12	Natural	Class II	x	347	0.02	347	344	0.02	344	344	0.02	344	344	0.02	344	344	0.02	344	344	0.02	344	344	0.02	
S5-s287a_1	Unnamed trib of Bryant Creek	Ephemeral	-	37	0.01	Natural	Class I	x	164	0.01	0	141	0.01	0	57	0.01	0	88	0.01	0	88	0.01	0	88	0.01	0	88	0.01	0

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									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	
S5-s314a	Unnamed trib of Bryant Creek	Ephemeral	-	18	0.01	Roadside Ditch	Modified Class I		156	0.01	156	8	0.01	8	8	0.01	8	8	0.01	8	8	0.01	8	7	0.01	7	
S5-s314b	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.10	Concrete Gutter	Modified Class I	x	498	0.03	498	498	0.03	498	498	0.03	498	498	0.03	498	498	0.03	498	498	0.03	498	
S5-s314b_1	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.10	Concrete Gutter	Modified Class I		500	0.03	500	500	0.03	500	500	0.03	500	500	0.03	500	500	0.03	500	500	0.03	500	
S5-s314c	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.10	Culvert		x	199	0.01	0	199	0.01	0	199	0.01	0	199	0.01	0	199	0.01	0	199	0.01	0	0
S5-s315a	Unnamed trib of Bryant Creek	Ephemeral	-	25	0.04	Natural	Class I	x	875	0.04	875	202	0.01	202	228	0.01	228	228	0.01	228	228	0.01	228	229	0.01	229	
S5-s315b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.04	Culvert		x	168	0.01	0	168	0.01	0	168	0.01	0	168	0.01	0	168	0.01	0	168	0.01	0	0
S5-s315c	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.04	Concrete Gutter	Modified Class I	x	878	0.04	878	878	0.04	878	878	0.04	878	878	0.04	878	878	0.04	878	878	0.04	878	
S5-s315d	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.04	Culvert		x	115	0.01	0	115	0.01	0	115	0.01	0	115	0.01	0	115	0.01	0	115	0.01	0	0
S5-s316_1	Unnamed trib of Bryant Creek	Ephemeral	-	33	0.01	Natural	Class I	x	379	0.04	379	323	0.04	323	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s316a	Unnamed trib of Bryant Creek	Ephemeral	-	30	0.02	Natural	Class I	x	285	0.02	285	168	0.01	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s316b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.02	Culvert		x	94	0.01	0	8	0.01	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s316c	Unnamed trib of Bryant Creek	Ephemeral	-	16	0.02	Natural	Modified Class I	x	337	0.02	337	337	0.02	337	73	0.01	73	73	0.01	73	73	0.01	73	73	0.01	73	
S5-s316d	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.02	Culvert		x	56	0.01	0	56	0.01	0	56	0.01	0	56	0.01	0	56	0.01	0	56	0.01	0	0
S5-s317	Unnamed trib of Bryant Creek	Ephemeral	-	15	0.01	Natural	Class I	x	408	0.02	408	0	0.00	0	7	0.01	7	7	0.01	7	7	0.01	7	7	0.01	7	
S5-s318	Unnamed trib of Bryant Creek	Ephemeral	-	24	0.01	Natural	Class I	x	112	0.01	112	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s319_1a	Unnamed trib of Bryant Creek	Ephemeral	-	16	0.01	Concrete Gutter	Modified Class I	x	24	0.01	24	24	0.01	24	24	0.01	24	24	0.01	24	24	0.01	24	24	0.01	24	
S5-s319_1b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.01	Culvert		x	55	0.01	0	23	0.01	0	55	0.01	0	55	0.01	0	55	0.01	0	55	0.01	0	0
S5-s319_1c	Unnamed trib of Bryant Creek	Ephemeral	-	32	0.01	Natural	Modified Class II	x	51	0.01	51	0	0.00	0	27	0.01	27	27	0.01	27	27	0.01	27	38	0.01	38	
S5-s319a	Unnamed trib of Bryant Creek	Ephemeral	-	30	0.02	Natural	Class I	x	518	0.06	518	315	0.04	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s319b	Unnamed trib of Bryant Creek	Ephemeral	-	46	0.02	Natural	Class II	x	172	0.01	172	0	0.00	0	11	0.01	11	11	0.01	11	11	0.01	11	14	0.01	14	
S5-s320	Unnamed trib of Bryant Creek	Ephemeral	-	29	0.01	Natural	Class I	x	437	0.07	437	215	0.03	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s325	Unnamed trib of Little Indian Creek	Ephemeral	-	25	0.01	Natural	Class I	x	525	0.05	525	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s326a	Unnamed trib of Little Indian Creek	Ephemeral	-	6	0.01	Natural	Modified Class I	x	251	0.01	251	116	0.01	116	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s326b	Unnamed trib of Little Indian Creek	Intermittent	-	38	0.43	Natural	Class I	x	251	0.05	251	250	0.05	250	84	0.02	84	75	0.01	75	99	0.02	99	97	0.02	97	
S5-s326c	Unnamed trib of Little Indian Creek	Intermittent	-	19	0.43	Roadside Ditch	Modified Class I	x	592	0.04	592	592	0.04	592	592	0.04	592	592	0.04	592	592	0.04	592	592	0.04	592	
S5-s327	Unnamed trib of Little Indian Creek	Ephemeral	-	22	0.01	Natural	Class I	x	169	0.01	169	95	0.01	95	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s328	Unnamed trib of Little Indian Creek	Ephemeral	-	17	0.01	Natural	Class I	x	144	0.01	144	96	0.01	96	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s330a	Unnamed trib of Little Indian Creek	Ephemeral	-	18	0.04	Natural	Class I	x	99	0.01	99	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s330b	Unnamed trib of Little Indian Creek	Intermittent	-	34	0.04	Natural	Class I	x	143	0.02	143	120	0.01	120	103	0.01	103	106	0.01	106	101	0.01	101	101	0.01	101	
S5-s330b_1	Unnamed trib of Little Indian Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I	x	426	0.01	426	426	0.01	426	426	0.01	426	426	0.01	426	426	0.01	426	426	0.01	426	
S5-s330c	Unnamed trib of Little Indian Creek	Intermittent	-	17	0.04	Concrete Gutter	Modified Class I	x	832	0.02	832	832	0.02	832	832	0.02	832	832	0.02	832	832</						

Appendix A - Table 1 - Stream Impacts and Stream Relocation Lengths by Alternative

Stream ID#	Stream Name	USGS Stream Type	QHEI Score	HHEI Score	Drain Area (mi ²)	Channel Type	Stream Habitat Classification	Waters of the U.S.	Alternative 4			Alternative 5			Alternative 6			Alternative 7			Alternative 8			RPA 8			
									LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	LF in ROW	AC in ROW	LF Relo.	
S5-s349a	Unnamed trib of Little Indian Creek	Intermittent	-	56	0.92	Natural	Class II	x	0	0.00	0	219	0.03	0	206	0.03	206	173	0.02	0	206	0.03	206	182	0.02	0	
S5-s349b	Unnamed trib of Little Indian Creek	Intermittent	-	-	0.92	Culvert		x	0	0.00	0	0	0.00	0	0	0.00	0	13	0.01	0	0	0.00	0	22	0.01	0	
S5-s349c	Unnamed trib of Little Indian Creek	Intermittent	-	53	0.97	Natural	Class II	x	84	0.02	0	163	0.04	0	665	0.15	665	79	0.02	0	665	0.15	665	92	0.02	0	
S5-s349d	Unnamed trib of Little Indian Creek	Intermittent	-	-	0.97	Culvert		x	183	0.04	0	183	0.04	0	183	0.04	0	183	0.04	0	183	0.04	0	183	0.04	0	
S5-s349e	Unnamed trib of Little Indian Creek	Intermittent	-	32	0.97	Natural	Class I	x	764	0.17	698	259	0.06	0	720	0.16	720	253	0.06	0	712	0.16	712	144	0.03	0	
S5-s350a	Jordan Creek	Perennial	30	-	2.72	Natural	Limited Resource Water	x	0	0.00	0	169	0.02	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0
S5-s350b	Jordan Creek	Perennial	24	-	2.72	Natural	Limited Resource Water	x	218	0.03	0	157	0.02	0	209	0.02	0	195	0.02	0	196	0.02	0	207	0.02	0	
S5-s350c	Jordan Creek	Perennial	24	-	2.72	Bridge	Limited Resource Water	x	129	0.01	0	129	0.01	0	129	0.01	0	129	0.01	0	129	0.01	0	129	0.01	0	
S5-s350d	Jordan Creek	Perennial	24	-	2.72	Natural	Limited Resource Water	x	248	0.03	0	357	0.04	0	98	0.01	0	225	0.03	0	98	0.01	0	225	0.03	0	
S5-s351a	Buckner Branch	Intermittent	31	-	1.25	Natural	Limited Resource Water	x	230	0.03	0	240	0.03	0	101	0.01	0	87	0.01	0	106	0.01	0	94	0.01	0	
S5-s351b	Buckner Branch	Intermittent	-	-	1.25	Culvert		x	192	0.03	0	192	0.03	0	192	0.03	0	192	0.03	0	192	0.03	0	192	0.03	0	
S5-s351c	Buckner Branch	Intermittent	31	-	1.25	Natural	Limited Resource Water	x	203	0.03	0	246	0.03	0	84	0.01	0	81	0.01	0	81	0.01	0	92	0.01	0	
S5-s357a	Unnamed trib of Bryant Creek	Ephemeral	-	22	0.01	Natural	Class I	x	95	0.01	0	93	0.01	0	93	0.01	0	93	0.01	0	93	0.01	0	93	0.01	0	
S5-s357b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.01	Culvert		x	318	0.01	0	318	0.01	0	318	0.01	0	318	0.01	0	318	0.01	0	318	0.01	0	
S5-s357c	Unnamed trib of Bryant Creek	Ephemeral	-	40	0.01	Natural	Class II	x	55	0.01	0	55	0.01	0	55	0.01	0	55	0.01	0	55	0.01	0	55	0.01	0	
S5-s358a	Unnamed trib of Bryant Creek	Ephemeral	-	10	0.01	Natural	Class I	x	104	0.01	0	102	0.01	0	102	0.01	0	102	0.01	0	102	0.01	0	102	0.01	0	
S5-s358b	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.01	Culvert		x	290	0.01	0	290	0.01	0	290	0.01	0	290	0.01	0	290	0.01	0	290	0.01	0	
S5-s358c	Unnamed trib of Bryant Creek	Ephemeral	-	22	0.01	Natural	Modified Class I	x	27	0.01	0	27	0.01	0	27	0.01	0	27	0.01	0	27	0.01	0	27	0.01	0	
S5-s359_2	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.03	Concrete Gutter	Modified Class I	x	693	0.02	693	693	0.02	693	585	0.02	585	585	0.02	585	585	0.02	585	585	0.02	585	
S5-s359b	Unnamed trib of Bryant Creek	Ephemeral	-	48	0.05	Natural	Class II	x	71	0.01	71	69	0.01	69	0	0.00	0	0	0.00	0	0	0	0.00	0	0	0	0
S5-s359c	Unnamed trib of Bryant Creek	Ephemeral	-	-	0.05	Culvert		x	347	0.03	0	347	0.03	0	328	0.02	0	328	0.02	0	328	0.02	0	328	0.02	0	
S5-s360b_1	Unnamed trib of Fox Hollow	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		355	0.01	355	355	0.01	355	355	0.01	355	355	0.01	355	355	0.01	355	355	0.01	355	
S5-s361	Unnamed trib of Little Indian Creek	Ephemeral	-	50	0.01	Natural	Class II	x	255	0.08	255	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0.00	0	0	0	
S5-s361_1	Unnamed trib of Little Indian Creek	Ephemeral	-	32	0.01	Natural	Class I	x	68	0.01	68	0	0.00	0	0	0.00	0	0	0.00	0	0	0	0.00	0	0	0	
S5-s363a	Unnamed trib of Bryant Creek	Ephemeral	-	38	0.01	Natural	Class I	x	132	0.01	132	132	0.01	132	132	0.01	132	132	0.01	132	132	0.01	132	132	0.01	132	
S5-s365	Unnamed trib of Bryant Creek	Ephemeral	-	27	0.01	Natural	Class I	x	184	0.01	184	187	0.01	187	144	0.01	144	144	0.01	144	144	0.01	144	144	0.01	144	
S5-s366	Unnamed trib of Payne Hollow	Ephemeral	-	21	0.01	Natural	Class I	x	10	0.01	10	19	0.01	19	0	0.00	0	0	0.00	0	0	0	0.00	0	0	0	
S5-s368	Unnamed trib of Bryant Creek	Ephemeral	-	40	0.01	Natural	Class II	x	86	0.01	0	85	0.01	0	0	0.00	0	0	0.00	0	0	0	0.00	0	0	0	
S5-s383	Unnamed trib of Bryant Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I	x	160	0.01	160	141	0.01	141	141	0.01	141	141	0.01	141	141	0.01	141	141	0.01	141	
S5-s384a	Unnamed trib of Indian Creek	Ephemeral	-	22	0.02	Roadside Ditch	Modified Class I		2,379	0.10	2,379	2,379	0.10	2,379	2,379	0.10	2,379	2,379	0.10	2,379	2,379	0.10	2,379	2,379	0.10	2,379	
S5-s384b	Unnamed trib of Indian Creek	Ephemeral	-	12	0.04	Concrete Gutter	Modified Class I		101	0.01	101	101	0.01	101	101	0.01	101	101	0.01	101	101	0.01	101	101	0.01	101	
S5-s384b_1	Unnamed trib of Indian Creek	Ephemeral	-	12	0.01	Concrete Gutter	Modified Class I		42	0.01	42	42	0.01	42	42	0.01	42	42	0.01	42	42	0.01	42	42	0.01	42	
S5-s384c	Unnamed trib of Indian Creek	Ephemeral	-	-	0.04	Culvert		x	48	0.01	0	48	0.01	0	48	0.01	0	48	0.01	0	48	0.01	0	48	0.01	0	
S5-s384d	Unnamed trib of Indian Creek	Ephemeral	-	12	0.04	Concrete Gutter	Modified Class I		99	0.01	99	99	0.01	99	99	0.01	99	99	0.01	99	99	0.01	99	99	0.01	99	
S5-s420	Unnamed trib of Clear Creek	Ephemeral	-	12	0.02	Concrete Gutter	Modified Class I		0	0.00	0	0	0.00	0	499	0.01	499	499	0.01	499	499	0.01	499	499	0.01	499	
Grand Total									106,445	13.57	73,463	103,165	13.59	68,675	85,192	11.49	55,557	83,291	11.23	53,360	86,404	11.70	56,480	80,582	10.24	51,629	

Abbreviations:

LF = Linear feet, USGS = United States Geological Survey, HHEI = Headwater Habitat Evaluation Index, QHEI = Qualitative Headwater Evaluation Index, Relo. = Relocation, Ripar. = Riparian, ROW = Right-of-way, trib = Tributary

† At least a portion of this stream lies within the bifurcation area. The total stream length is 6,579 LF within the bifurcation area under all alternatives. Within the bifurcation area the total stream relocation is 5,218 LF under all alternatives.

Note: Width of the ordinary high water mark (OHWM) x linear feet of impact = acres of impact. HHEI and OHEI were not completed on culverted segments of the stream.